MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

February 27, 1991

To: Benedict Okwumabua, Livonia, WMD

From: Jan Sealock, EQA, WMD JAN

Subject: Quanex Corporation, South Lyons, MI MID 082 767 591

Attached for your information are three copies of Quanex's FY 1991 O&M Inspection. Included with this package is a memo from Dave Slayton and myself with two additional attachments. These items are all being sent to you as outlined in Al Howard's January 25, 1990 Operational Memo 64-4. The steps needed to complete the process are outlined below for your information:

1. The inspection documents should be reviewed to familiarize yourself with the contents.

2. The draft "WMD/District Personnel Summary Letter for CME and O&M Inspections" should be completed, and the recommendations in Dave Slayton/Jan Sealock's memo attached for forwarding on to the facility.

3. The CMEL form accompanying the above two documents should also be completed, based upon your evaluation of the compliance status of the facility.

4. The inspection packets and forms should then be handled in the following manner:

    a. One packet, with copies of the final District summary letter and the completed CMEL should be sent to US EPA, Region V.

    b. One packet, with the original final District summary letter should be given to the facility.

    c. One packet, with copies of the final District summary letter and CMEL should be maintained in the District files.

    d. A copy of the final District summary letter and CMEL should be sent to HW Geotech Unit to update the Unit and WMD C&E files.

Please call Dave Slayton or myself if you have any questions.

cc: Ms. D. Montgomery ✓

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

March 17, 1988

TO: Lynne King, Northville District Office, WMD

FROM: Liz Browne, HW Permits, WMD

SUBJECT: Quanex Corp., Michigan Seamless Tube Division
South Lyons, MID 082 767 591

On February 10, 1988 I conducted a sampling inspection at this facility as part of a Comprehensive Monitoring Evaluation (CME). Although no violations of 40 CFR 265.92 [as referenced in Act 64 R299.11003(m)] were found at this time, concerns were noted and are mentioned within the following inspection summary.

EDI Engineering and Science of Grand Rapids conducts all field and laboratory work for the facility. The Ground Water Quality Assessment Program, dated April, 1986, authored by EDI, contained the Sampling and Analysis Plan (SAP) that was used for this review.

Static water level readings are taken with a steel tape to the nearest 0.01 foot. The readings are taken to the top of the casing, and not to the top of the locking cap. Although this is stated in the plan, it should be emphasized to field staff should personnel change. Measurements compared reasonably well with those obtained with the DNR meter.

Purging is accomplished using either stainless steel or teflon bottom filling bailers and polypropelene rope. A new bailer, steam cleaned prior to the site visit, with new rope attached at the time of purging is used. Three casing volumes are purged prior to sampling. The purge water is directed into a graduated bucket to enable a volume measurement, and to facilitate the disposal of the water away from the well. The methods used to determine purge volume needed, method of measuring purge volume removed, and the disposal of the purge water should all be addressed in the plan.

Samples are obtained using the same equipment as, and immediately after, purging, where recovery allows. The plan states that the wells should be sampled within 24 hours of purging. Sampling immediately after purging is the preferable method. If this is not possible, recovery rates should be determined for each well, and sampling done as soon as sufficient volume exists.

Field measured parameters include pH and specific conductance. The meters are calibrated at the beginning of the day. The plan only mentions pH as a field parameter, and does not address the meter calibration. The plan should be updated to reflect field conditions. Other

field work includes the filtering of the metals sample immediately upon collection, prior to preservation. These are all excellent field methods to attempt to maintain the integrity of unstable parameters.

Field QA/QC procedures include the use of clean bailers and new line as already mentioned. Additionally, trip and equipment blanks and sample replicates are used to evaluate the sampling program. These are all good measures to help to assure that representative samples are taken. One item of concern noted during the sampling was the handling of the bailer during volatile organic sampling. The bailer should be lowered carefully for all sample collection, to reduce aeration, but especially for the volatile organics. A note to emphasize this may be appropriate in the plan. Other items of potential concern were not noted during this inspection. The sampling crew appeared to be familiar with the plan, worked carefully, and kept adequate field notes.

Chain of custody appears to be well documented. Field notes, bottle labels, a chain of custody form and an Analytical Services Project Sheet are used to track all samples. Copies of all forms have been included in the plan. Good control can be maintained since sample requests, bottle orders, sampling and analysis are all handled by EDI.

A list of sample parameters with sample container, preservation, holding time, minimum sample size and method references is included in the plan. A table indicating the detection limit attainable by EDI's laboratory is needed to complete this set of information. Also, the method references for some parameters appear to be in error. The Standard Methods reference should be 421, not 412 for dissolved oxygen. Nitrate-nitrite should be method 353 for reference 3, not 201. Reference 3 method 415 should be cited for organic carbon, not 236. All references should be rechecked. The latest editions of the references (SW-846 3rd edition and Standard Methods 16th edition) should be used. Specific methods should be cited, rather than items 200-289 for metals analysis.

A quality assurance/quality control program for EDI's laboratory is needed. Items such as the use of spikes, duplicate samples and standards should be included. The plan does indicate that lab notebooks are kept, and discusses some of the items to be included. This additional information is needed to assure that the careful practices that were evidenced in the field are maintained through the sample preparation and analysis steps.

In summary, both the written plan and the field work were acceptable in most areas. The plan needs to be updated to include details on purging and lab QA/QC. It should also be changed to better reflect the field measurement information, measuring both pH and specific conductance at the time of sampling, as well as the method and schedule of meter calibration. More information on the methods used to filter the samples, and to decontaminate this equipment should be included. Clarification on the time elapsed between purging and sampling should be made, and a note on the care needed for volatile organic sampling should be added. Finally, Table 13 should include detection limits, and the method references need to be checked and updated to reflect newer editions of the references, where applicable.

This concludes the sampling and analysis portion of the CME inspection. A final summary document (including a hydrogeo evaluation, statistical review, ground water contours, etc.) will be forthcoming.

Please call if you have any questions regarding this review.

cc Mr. D. Slayton
Mr. J. Bohunsky
Mr. D. Drake
C&E File
CME Reports ✓
Ms. M. Sabadaszka, U.S. EPA-Region V

MID 082 767 591

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

John Hannah Building, P.O. Box 30241, Lansing, MI 48909

ROLAND HARMES, Director

March 23, 1994

Mr. Donald Comfort
Engineering Manager
Quanex Corporation
400 McMunn
South Lyon, Michigan 48178

Dear Mr. Comfort:

Subject: Quanex 1993 O&M Report
MID 082 767 591

An O&M inspection has been conducted at the Quanex Corporation, of South Lyon. The inspection included a field audit and split sampling of groundwater (September 27, 1993), O&M checklist, sampling and analysis inspection, monitor well data sheets, groundwater contour map, stiff\piper\pie diagram, and data comparison.

The latest sampling and analysis plan for groundwater monitoring is located within the Groundwater Quality Assessment Program dated April of 1986. This was then approved with revisions on May 20, 1992 by the Michigan Department of Natural Resources.

The attachment to this memo lists one area of concern identified during the field inspection on September 27, 1993. The concern was that depth or sounding measurements were not taken for some of the wells. It is common for sediments to accumulate at the bottom of the well thus changing the depths of the well and the amount of water evacuated for purging. It is therefore, good practice to take depth measurements at each sampling event.

If there are any questions, please contact the number listed below or Mr. David Slayton at 517-373-8012.

Sincerely,

Jan Sealock

Jan Sealock
Environmental Quality Analyst
Waste Management Division
517-373-4740

cc/enc: Ms. De Montgomery/U.S. EPA Reporting
Mr. Ben Okwumabua, DNR-Livonia
Mr. Dave Slayton, DNR
HWP/C&E File

R 1026-E9
Rev. 12/93

ATTACHMENT

Quanex Corporation
MID 082 767 591
O&M Inspection-1993

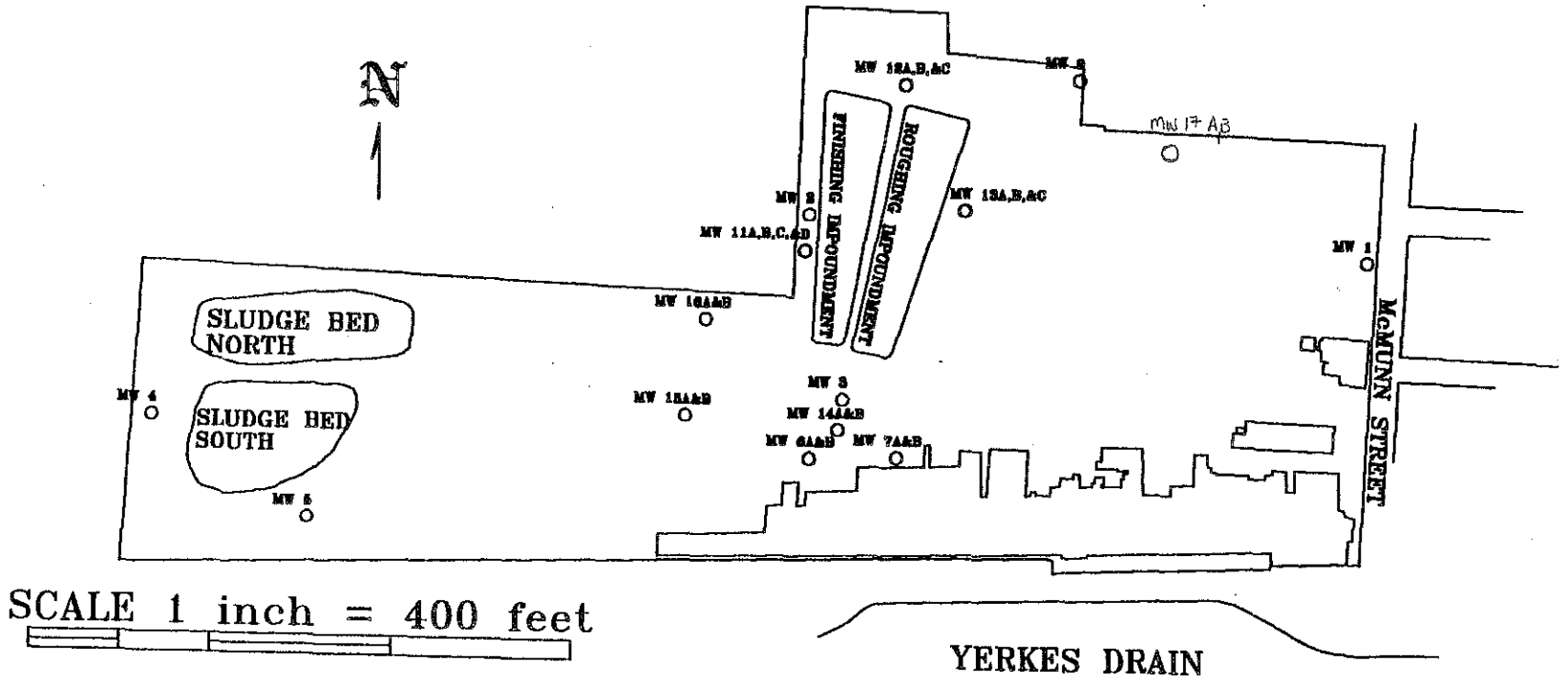
1). Depth or sounding measurements were not taken at some of the wells. This measurement should be taken at each sampling event. [Area of Concern].

Quanex
MID 082 767 591

Operation and Maintenance Inspection

Conducted By
Waste Management Division
Michigan Department of Natural Resources

BASE MAP OF QUANEX MONITOR WELLS



QUANEX CORPORATION

SOUTH LYON, MICHIGAN

MID 082 767 591

OPERATION AND MAINTENANCE INSPECTION

Field Inspection Guide

Sampling and Analysis Inspection

Monitor Well Data Sheets

Ground Water Contour Map

Additional Reviews

1. Stiff\Piper\Bar Diagrams
2. Data Comparison

Summary Letter

Evaluated By:

Mr. Dave Slayton
Ms. Jan Sealock
Waste Management Division
Michigan Department of Natural Resources

September 27, 1993

Field Inspection Guide Checklist

APPENDIX B
Part Two

Field Inspection Guide

PART TWO

The field inspector will complete four tasks during the field inspection. They are: 1) review the operating record to identify evidence of deficiencies in the owner/operator's sampling and/or operation and maintenance programs; 2) visually inspect each well and piezometer for evidence of damage or deterioration; 3) obtain measurements from the operations record of depths of water levels and well depths for each well and piezometer; and 4) visually observe the owner/operator's field crew as they collect ground-water samples.

Name of inspector(s) Dave Slayton / Henry Loeble

Date(s) of inspection 9-27-93

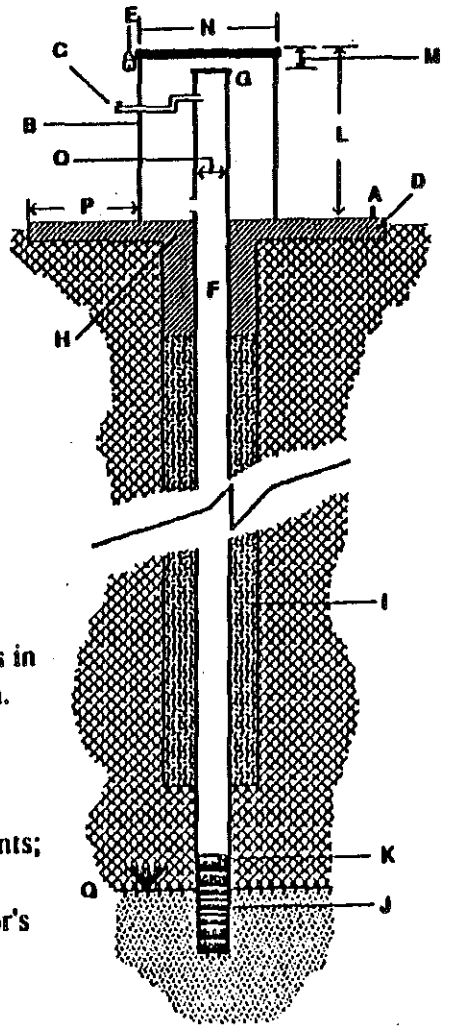
1. Review the operating record of the facility. Does the operating record:	Y/N
Include annual reports of ground-water monitoring results including ground-water level data from each well and piezometer in the monitoring system? Typ. Rept is file folder in desk, lab rep. Rept is another office	Y
Include an inventory of all sampling devices and purging equipment in use at the facility and information on model number, serial number and manufacurers name? disposable bailers used; WWES brings their own sampling equipment	inventory - yes serial #'s - no. N/A
Include detailed operating, calibration and maintenance procedures for each sampling device? included in SAP	Y
Describe decision criteria to be used to replace or repair sampling equipment and/or monitoring wells? replace wells if damaged (included in SAP)	Y
Include schedules for performing operation and maintenance activities related to the ground-water monitoring system? included in SAP	Y
Include records for ground-water monitoring which provide information on 1) the date, exact place and time of sampling or measurements; 2) the individual(s) who performed the sampling or measurements; 3) the date(s) analyses were performed; 4) the analytical techniques or methods used; and 5) the results of such analyses?	Y
* Include records of all monitoring information including all calibration and maintenance records? Co. said WWES keeps field logs → WWES said they give them to Co.	N
Include records of monitoring information including determination of ground-water surface elevations?	Y
Include a determination of ground-water flow rate and direction(s) in the uppermost aquifer on an annual basis (e.g., prepare a potentiometric map annually using data collected during the year)?	Y
Provide for more frequent and intensive inspection of wells constructed of non-inert casing such as PVC? (Refer to Appendix A for permit example.)	N

3. Obtain data on depth to standing water and depth to the bottom of each monitoring well and piezometer in the owner/operator's monitoring system. Record depth measurements to the nearest 0.01 feet. Record the measurements

Date	Well/ Piezometer I.D. No.	Depth to Water (0.01')		Depth of Well/ Piezometer (0.01')
		JOANEX	DNR	
9-27-93	MW-1A	12.61	12.66	
	MW-1C	14.19	14.19	
	MW-11A	15.45	15.40	
	MW-13A	11.20	11.19	
	MW-17A	12.66 ~~11.20~~	12.64 ~~11.19~~	23.2 ft.
	MW-17B	15.25	15.22	74½ ft.
	MW-1B	14.25	14.23	
	MW-13B		14.68	
	MW-13C		13.23	

Key:

A - survey elevation mark
B - protective outer casing
C - gas vent
D - concrete apron
E - fitted lock
F - primary casing material
G - cap for primary casing
H - bore hole seal
I - annular space seal
J - well screen
K - filter pack
L - height of riser
M - elevation difference
N - diameter of outer casing
O - diameter of primary casing
P - radius of apron
Q - water level below surface



1. The field inspector has several options in collecting ground water elevation data. The inspector may:
   a. obtain past data from the operating record;and/or
   b. take his/her own depth measurements; and/or
   c. obtain data from the owner/operator's sampling crew.

(Continued)

Well Identification Number _____	Y/N	Photograph Taken Y/N
If the sampling crew used dedicated samplers, did they disassemble and thoroughly clean the devices between samples? used disposable bailers – no need to clean devices between samples	NA	
If samples are collected for organic analyses, did the cleaning procedure include the following steps: 1. non phosphate detergent wash 2. tap water rinse 3. distilled/deionized water rinse 4. acetone rinse 5. pesticide-grade hexane rinse? disposable bailers lab prepared bottles	NA	
If samples are collected for inorganic analyses, does the cleaning procedure include the following steps: 1. dilute acid rinse (HNO_3 or HCL) 2. distilled/de-ionized water rinse? disposable bailers lab prepared bottles	NA	
Did the sampling crew take trip blanks, field blanks and equipment blanks?	Y	
If the sampling crew used bailers, were they bottom valve bailers?	N	
If the sampling crew used bailers, was "teflon" coated wire, single strand stainless steel wire or monofilament used to raise and lower the bailer? polypropylene line	N	
If the sampling crew used bailers, did they lower the bailer slowly to the well?	Y	
If the sampling crew used bailers, were the bailer contents transferred to the sample container to minimize agitation and aeration?	Y	
Did the sampling crew take care to avoid placing clean sampling equipment, hoses, and lines on the ground or other contaminated surfaces prior to insertion in the well?	Y	
If the sampling crew used dedicated bladder pumps: Was the compressed gas from an oilless compressor certified quality commercial compressed gas cylinder? If not, was a suitable oil removal purification system installed and maintained? used bailers	NA	
Was the bladder pump controller capable of throttling the bladder pump discharge flow to 100 ml/min or less for continuous periods of at least 20-30 seconds without restricting liquid discharge?	NA	

(Continued)

Well Identification Number _____	Y/N	Photograph Taken Y/N
Were samples taken from the bladder pump discharge tube, and not from any purge device discharge tube? samples collected w/ bailer	NA	
Was the bladder pump discharge flow checked for the presence of gas bubbles before each sample collection, as a test for bladder integrity?	NA	
Was bladder pump flow performance monitored regularly for dropoff in flow rate and discharge volume per cycle?	NA	
Was the bladder pump incorporated in a combination sample-purge pump design which can expose the bladder pump interior and discharge tubing to the pump drive gs? If so, were operating procedures established and followed to prevent at all times the entry of drive gas into the sample flow or into the bladder pump interior?	NA	
Did the sampling crew collect and containerize samples in the order of the volatilization sensitivity of the parameters?	Y	
Did the sampling crew measure the following parameters in the field: pH, temperature, specific conductane?	Y	
Did the sampling crew sample background wells before sampling downgradient wells? not necessary → dedicated equipment		
Did the sampling crew use fluorocarbon resin or (polyethylene) containers with polypropylene caps for samples requiring metals analysis?	Y	
Did the sampling crew use glass bottles with fluorocarbon resin-lined caps for samples requiring metals analysis?	N	
If metals were the analytes of concern, did the sampling crew use containers cleaned with nonphosphate detergent and water, and rinsed with nitric acid, tap water, hydrochloric acid, tap water and finally Type II water? lab prepared containers	NA	
If organics were the analytes of concern, did the sampling crew use containers cleaned with nonphosphate detergent, rinsed with tap water, distilled water, acetone, and finally pesticide quaility hexane? lab prepared containers	NA	
Did the sampling crew filter samples requiring analysis for organics? organics should not be filtered	NA	

After working through Part Two, the field inspector will have:

- assessed whether the owner/operator's sampling crew departed from written sampling and analysis procedures as contained in the owner/operator's sampling and analysis plan (interim status) or in the owner/operator's RCRA permit (permit status);

- identified deficiencies in the way the owner/operator's sampling crew collected ground-water samples;

- identified deficiencies in the owner/operator's program to ensure on-going maintenance of sampling devices and monitoring wells/piezometers;

- identified deficiencies in the owner/operator's operating record (Does theoperating record have all the information in it that is required?); and

- collected field data that will allow the enforcement official to construct potentiometric maps and assess the viability of individual wells.

Sampling and Analysis Inspection

SAMPLING AND ANALYSIS INSPECTION
QUANEX CORPORATION
MID 082 767 591

On September 27th, 1993, a sampling inspection was conducted at the Quanex Corporation as part of an Operation and Maintenance Inspection (O&M). The latest Sampling and Analysis Plan (SAP), is dated April, 1986 with revisions added from deficiencies found in the 1990 O&M inspection.

Consultant Jim Wooster from WW Engineering and Science (WWES) of Livonia was involved in the split sampling. Static water level measurements were conducted using an electric meter by both the MDNR and WWES. All measurements were taken to the nearest .01th of a foot to be used in the making of groundwater contour maps. The largest difference in readings between the wells was .05 feet. For decontamination purposes, WWES rinsed the electric meter with an ample amount of deionized water between the wells. Static water level measurements, purging and sampling was all conducted on September 27, 1993.

A polyethylene disposable bailer was utilized to purge the wells. Purge volumes on the 27th were based on three times the casing water volume, or until the well ran dry. At many of the wells a sounding or depth measurement was not taken. It is important to take the depth measurement at each sampling event due to the settling of sediment that may occur at the bottom of each well. The evacuated water was discharged to a bucket and dumped away from the well. WWES followed good safety protocol by wearing gloves while collecting samples from the wells.

The disposable bailer was also used to collect the water samples that day. No decontamination of the bailers was needed since they were disposable. New polyethylene line was tied to each bailer before sampling. Those samples collected for volatiles were poured slowly from the bailer to reduce aeration of the sample. Samples were stored in appropriate bottles for analysis. The samples were immediately transferred to coolers filled with ice.

Both field parameters of pH and specific conductivity were taken by WWES and the MDNR. Both Meters were calibrated before use, also the pH meter was checked before each well with a buffer. An equipment blank, trip blank and duplicate samples were all taken as part of field QA\QC protocol.

The Sampling and Analysis Plan (SAP), was last revised after the O&M conducted in December of 1990. After review of the plan and sampling procedures, the plan is considered complete.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
WASTE MANAGEMENT DIVISION
Water Sampling Data Sheet

FACILITY: Quanex LOCATION: South Lyon
CONTACT: Donald Comfort PHONE: ( )

Sample #		MW-1A	MW-10	MW-11A	MW-13A	MW-17A	MW-17B
Date		9-27-93	→	→	→	→	→
Time		9:33	10:25	12:20	8:42	11:10	11:35
pH (field)		6.74	6.88	6.84	6.35	6.86	6.90
Conductivity (field)		1150	1080	2140	1650	1330	790
Temperature (°c) (field)		–	–	–	–	–	–
TDS (field)		–	–	–	–	–	–
PO	1	✓	✓	✓	✓	✓	✓
PO	2	✓	✓	✓	✓	✓	✓
ON	3						
OB	GC/MS B/N						
OA	8						
OG	oil & grease						
(MA/D)	Basic 6/Fe/Mn	✓	✓	✓	✓	✓	✓
	Ca/Mg/Na/K	✓	✓	✓	✓	✓	✓
	Hg/(As)/Se/Sb/(BA)	✓	✓	✓	✓	✓	✓
MN	Cl/SO_4/Alk						
	HCO_3/CO_3						
	Fluoride/Cr^{+6}						
GA	COD/TOC						
	NO_3NO_2/NH_3						
	Kjel N/TotP						
GG	Phenols						
GB	Total/Free Cn						
Sample Appearance		clear	clear	clear	clear	clear	clear

Additional Notes:

Basic 6 = Cd, Cr, Cu, Ni, Pb, Zn

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
WASTE MANAGEMENT DIVISION
Water Sampling Data Sheet

FACILITY: Quanex LOCATION: South Lyon
CONTACT: Donald Comfort PHONE: ( )

Sample #		F.B.					
Date		9-27-93					
Time		11:30					
pH (field)		—					
Conductivity (field)		—					
Temperature (°c) (field)		—					
TDS (field)		—					
PO	1	✓					
PO	2	✓					
ON	3						
OB	GC/MS B/N						
OA	8						
OG	oil & grease						
(MA/D)	Basic 6/Fe|Mn	✓					
	Ca/Mg/Na/K	✓					
	Hg/(As)/Se/Sb/(Ba)	✓					
MN	Cl/SO_4/Alk						
	HCO_3/CO_3						
	Fluoride/Cr^+6						
GA	COD/TOC						
	NO_3NO_2/NH_3						
	Kjel N/TotP						
GG	Phenols						
GB	Total/Free Cn						
Sample Appearance		clear					

Additional Notes:

Basic 6 = Cd, Cr, Cu, Ni, Pb, Zn

DNR sampling staff: _____

Facility sampling staff: _____

* If purging and/or sampling methods differ, report DNR method/facility method

Monitor Well #						
Static Water Level						
Static Method						
Sounding						
Volume Purged						
Purging Method						
Sampling Method						
Lysimeter #						
Volume Purged						
Sampling Method						
Surface Water #						
Description						
Sampling Method						
Detection System #						
Sampling Method						
Private Well #						
Location Sampled						
Length of Time Purged						

Facility Sampling Notes:

Potential External Sources of Contamination: _____

Precautions Taken: _____

Field Measurements Taken: _____

Handling/Preservation: _____

Sampling Bottles Used: _____

Replicates and/or Blanks Taken: _____

Decontamination Procedures: _____

Additional Notes: _____

EMB 18

DNR sampling staff: Ginny LaSalle * Dave Slayton

Facility sampling staff:

* If purging and/or sampling methods differ, report DNR method/facility method

Monitor Well #	MW-1A	MW-1C	MW-11A	MW-13A	MW-17A	MW-17B
Static Water Level	12.66'	14.19'	15.40'	11.19'	12.64'	15.22'
Static Method	Electric Meter			Electric Meter		
Sounding				21.5'	23.2'	74½'
Volume Purged	3¾ gal.	31¼ gal.	5.75 gal.	5 gal.	5½ gal.	30½ gal.
Purging Method	Polyethylene Bailer	Polyethylene Bailer	Polyethylene Bailer	Polyethylene Bailer	Polyethylene Bailer	Polyethylene Bailer
Sampling Method	" "	" "	" "	" "	" "	" "
Lysimeter #						
Volume Purged						
Sampling Method						
Surface Water #						
Description						
Sampling Method						
Detection System #						
Sampling Method						
Private Well #						
Location Sampled						
Length of Time Purged						

Facility Sampling Notes:

Potential External Sources of Contamination: None Noted

Precautions Taken: Steel Toed boots, Gloves, Safety Glasses

Field Measurements Taken: pH, Conductivity

Handling/Preservation: As Appropriate

Sampling Bottles Used: As Appropriate

Replicates and/or Blanks Taken: Field Blanks

Decontamination Procedures: Deionized Water Rinse

Additional Notes:

EMB 8 3

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY

REPORT Waste Management Division
TO Ottawa Building
Lansing, MI 48909

ATTEN JAN SEALOCK

LABORATORY WORK ORDER # 93-09-164
WORK ID GUANEX
P.O. # 60026 COST # 1745.80
RECEIVED 09/27/93 CLIENT WM
REPORTED _____ NUMBER OF SAMPLES 7
LAB CONTACT DR IN MATRIX WATER

TEST / UNITS	MW-1A	MW-1C	MW-11A	MW-13A
Alkalinity of Water mg CaCO3/l	289	339	206	786
Carbonate Alkalinity mg CaCO3/l	K 5	K 5	K 5	K 5
Bicarbonate Alkalinity mg CaCO3/l	289	339	206	786
Chloride in Water mg/l	101	107	156	17
Arsenic by Furnace - Diss. ug/l (Diss)	K 1.0	10.3	3.0	3.7
Barium - Dissolved ug/l (Diss)	85	80	26	200
Calcium - Dissolved mg/l (Diss)	142	122	306	277
Cadmium - Dissolved ug/l (Diss)	K 20	K 20	K 20	K 20
Chromium - Dissolved ug/l (Diss)	K 25	K 25	K 25	K 25
Copper - Dissolved ug/l (Diss)	K 20	K 20	K 20	K 20
Iron - Dissolved ug/l (Diss)	5000	2300	1800	9800
Potassium - Dissolved mg/l (Diss)	5.02	3.7	22.6	6.1
Magnesium - Dissolved mg/l (Diss)	14.4	28.1	43	43
Manganese - Dissolved ug/l (Diss)	270	38	470	650
Sodium - Dissolved mg/l (Diss)	61.6	55.4	99.4	26.5
Nickel - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Lead - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Zinc - Dissolved ug/l (Diss)	340	K 50	K 50	K 50
Sulfate in Water mg/l	114	47	676	53

Received: 09/27/93 12/03/93 12:31:00

TEST UNITS	MW-17A	MW-17B	FB
Alkalinity of Water mg CaCO3/l	275	285	K 20
Carbonate Alkalinity mg CaCO3/l	K 5	K 5	K 5
Bicarbonate Alkalinity mg CaCO3/l	275	285	K 20
Chloride in Water mg/l	169	58	K 1
Arsenic by Furnace - Diss. ug/l (Diss)	6.8	14.8	K 1.0
Barium - Dissolved ug/l (Diss)	54	146	K 5
Calcium - Dissolved mg/l (Diss)	164	90.8	K 1
Cadmium - Dissolved ug/l (Diss)	K 20	K 20	K 20
Chromium - Dissolved ug/l (Diss)	K 25	K 25	K 25
Copper - Dissolved ug/l (Diss)	K 20	K 20	K 20
Iron - Dissolved ug/l (Diss)	1900	1700	K 100
Potassium - Dissolved mg/l (Diss)	3.21	1.59	K .1
Magnesium - Dissolved mg/l (Diss)	16.7	30.3	K 1
Manganese - Dissolved ug/l (Diss)	240	28	K 20
Sodium - Dissolved mg/l (Diss)	91.4	12.6	K 1
Nickel - Dissolved ug/l (Diss)	K 50	K 50	K 50
Lead - Dissolved ug/l (Diss)	K 50	K 50	K 50
Zinc - Dissolved ug/l (Diss)	K 50	K 50	K 50
Sulfate in Water mg/l	148	41	K 2

Report prepared by: D Hartig 12-7-93

SAMPLE ID MW-1A FRACTION 01C TEST CODE W VOL NAME Volatile 8260 WATER
Date & Time Collected 09/27/93 Category

ANALYST GRINWIS
ANALYZED 09/28/93
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	REPORTED DETECTION LIMIT
74-87-3	Chloromethane	ND		5.0
75-01-4	Vinyl chloride	ND		5.0
74-83-9	Bromomethane	ND		5.0
75-00-3	Chloroethane	ND		5.0
67-64-1	2-Propanone (Acetone)	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
75-15-0	Carbon Disulfide	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
1634-04-4	Methyl Tert. Butyl Ether	ND		5.0
75-34-3	1,1-Dichloroethane	ND		1.0
78-93-3	2-Butanone (MEK)	ND		5.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
71-43-2	Benzene	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
591-78-6	2-Hexanone	ND		5.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
108-88-3	Toluene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
108-10-1	4-Methyl-2-Propanone (MIBK)	ND		5.0
124-48-1	Dibromochloromethane	ND		1.0
106-93-4	1,2-Dibromoethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3 & 106-42-3	m & p Xylene	ND		1.0
75-25-2	Bromoform	ND		1.0
100-42-5	Styrene	ND		1.0
95-47-6	o-Xylene	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.

SAMPLE ID MW-1C FRACTION 02C TEST CODE W VOL NAME Volatile 8260 WATER
Date & Time Collected 09/27/93 Category

ANALYST GRINWIS
ANALYZED 09/28/93
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	REPORTED DETECTION LIMIT
74-87-3	Chloromethane	ND		5.0
75-01-4	Vinyl chloride	ND		5.0
74-83-9	Bromomethane	ND		5.0
75-00-3	Chloroethane	ND		5.0
67-64-1	2-Propanone (Acetone)	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
75-15-0	Carbon Disulfide	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
1634-04-4	Methyl Tert. Butyl Ether	ND		5.0
75-34-3	1,1-Dichloroethane	ND		1.0
78-93-3	2-Butanone (MEK)	ND		5.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
71-43-2	Benzene	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
591-78-6	2-Hexanone	ND		5.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
108-88-3	Toluene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
108-10-1	4-Methyl-2-Propanone (MIBK)	ND		5.0
124-48-1	Dibromochloromethane	ND		1.0
106-93-4	1,2-Dibromoethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3 & 106-42-3	m & p Xylene	ND		1.0
75-25-2	Bromoform	ND		1.0
100-42-5	Styrene	ND		1.0
95-47-6	o-Xylene	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.

SAMPLE ID MW-11A FRACTION 03C TEST CODE W VOL NAME Volatile 8260 WATER
Date & Time Collected 09/27/93 Category

ANALYST GRINWIS
ANALYZED 09/28/93
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	REPORTED DETECTION LIMIT
74-87-3	Chloromethane	ND		5.0
75-01-4	Vinyl chloride	ND		5.0
74-83-9	Bromomethane	ND		5.0
75-00-3	Chloroethane	ND		5.0
67-64-1	2-Propanone (Acetone)	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
75-15-0	Carbon Disulfide	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
1634-04-4	Methyl Tert. Butyl Ether	ND		5.0
75-34-3	1,1-Dichloroethane	17	J	1.0
78-93-3	2-Butanone (MEK)	ND		5.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
71-43-2	Benzene	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
591-78-6	2-Hexanone	ND		5.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
108-88-3	Toluene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
108-10-1	4-Methyl-2-Propanone (MIBK)	ND		5.0
124-48-1	Dibromochloromethane	ND		1.0
106-93-4	1,2-Dibromoethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3 & 106-42-3	m & p Xylene	ND		1.0
75-25-2	Bromoform	ND		1.0
100-42-5	Styrene	ND		1.0
95-47-6	o-Xylene	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.

SAMPLE ID MW-13A FRACTION 04C TEST CODE W_VOL NAME Volatile 8260 WATER
Date & Time Collected 09/27/93 Category

ANALYST GRINWIS
ANALYZED 09/28/93
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	REPORTED DETECTION LIMIT
74-87-3	Chloromethane	ND		5.0
75-01-4	Vinyl chloride	ND		5.0
74-83-9	Bromomethane	ND		5.0
75-00-3	Chloroethane	ND		5.0
67-64-1	2-Propanone (Acetone)	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
75-15-0	Carbon Disulfide	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
1634-04-4	Methyl Tert. Butyl Ether	ND		5.0
75-34-3	1,1-Dichloroethane	ND		1.0
78-93-3	2-Butanone (MEK)	ND		5.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
71-43-2	Benzene	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
591-78-6	2-Hexanone	ND		5.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
108-88-3	Toluene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
108-10-1	4-Methyl-2-Propanone (MIBK)	ND		5.0
124-48-1	Dibromochloromethane	ND		1.0
106-93-4	1,2-Dibromoethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3 & 106-42-3	m & p Xylene	ND		1.0
75-25-2	Bromoform	ND		1.0
100-42-5	Styrene	ND		1.0
95-47-6	o-Xylene	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.

SAMPLE ID MW-17A FRACTION 05C TEST CODE W_VOL NAME Volatile 8260 WATER
Date & Time Collected 09/27/93 Category

ANALYST GRINWIS
ANALYZED 09/28/93
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	REPORTED DETECTION LIMIT
74-87-3	Chloromethane	ND		5.0
75-01-4	Vinyl chloride	ND		5.0
74-83-9	Bromomethane	ND		5.0
75-00-3	Chloroethane	ND		5.0
67-64-1	2-Propanone (Acetone)	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
75-15-0	Carbon Disulfide	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
1634-04-4	Methyl Tert. Butyl Ether	ND		5.0
75-34-3	1,1-Dichloroethane	1.4	J	1.0
78-93-3	2-Butanone (MEK)	ND		5.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	3.9		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
71-43-2	Benzene	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
591-78-6	2-Hexanone	ND		5.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
108-88-3	Toluene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
108-10-1	4-Methyl-2-Propanone (MIBK)	ND		5.0
124-48-1	Dibromochloromethane	ND		1.0
106-93-4	1,2-Dibromoethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3 & 106-42-3	m & p Xylene	ND		1.0
75-25-2	Bromoform	ND		1.0
100-42-5	Styrene	ND		1.0
95-47-6	o-Xylene	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.

SAMPLE ID MW-17B FRACTION 06C TEST CODE W VOL NAME Volatile 8260 WATER
Date & Time Collected 09/27/93 Category

ANALYST GRINWIS
ANALYZED 09/28/93
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	REPORTED DETECTION LIMIT
74-87-3	Chloromethane	ND		5.0
75-01-4	Vinyl chloride	ND		5.0
74-83-9	Bromomethane	ND		5.0
75-00-3	Chloroethane	ND		5.0
67-64-1	2-Propanone (Acetone)	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
75-15-0	Carbon Disulfide	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
1634-04-4	Methyl Tert. Butyl Ether	ND		5.0
75-34-3	1,1-Dichloroethane	ND		1.0
78-93-3	2-Butanone (MEK)	ND		5.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
71-43-2	Benzene	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
591-78-6	2-Hexanone	ND		5.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
108-88-3	Toluene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
108-10-1	4-Methyl-2-Propanone (MIBK)	ND		5.0
124-48-1	Dibromochloromethane	ND		1.0
106-93-4	1,2-Dibromoethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3 & 106-42-3	m & p Xylene	ND		1.0
75-25-2	Bromoform	ND		1.0
100-42-5	Styrene	ND		1.0
95-47-6	o-Xylene	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.

SAMPLE ID FB FRACTION 07C TEST CODE W_VOL NAME Volatile 8260 WATER
Date & Time Collected 09/27/93 Category

ANALYST GRINWIS
ANALYZED 09/28/93
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	REPORTED DETECTION LIMIT
74-87-3	Chloromethane	ND		5.0
75-01-4	Vinyl chloride	ND		5.0
74-83-9	Bromomethane	ND		5.0
75-00-3	Chloroethane	ND		5.0
67-64-1	2-Propanone (Acetone)	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
75-15-0	Carbon Disulfide	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
1634-04-4	Methyl Tert. Butyl Ether	ND		5.0
75-34-3	1,1-Dichloroethane	ND		1.0
78-93-3	2-Butanone (MEK)	ND		5.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
71-43-2	Benzene	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
591-78-6	2-Hexanone	ND		5.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
108-88-3	Toluene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
108-10-1	4-Methyl-2-Propanone (MIBK)	ND		5.0
124-48-1	Dibromochloromethane	ND		1.0
106-93-4	1,2-Dibromoethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3 & 106-42-3	m & p Xylene	ND		1.0
75-25-2	Bromoform	ND		1.0
100-42-5	Styrene	ND		1.0
95-47-6	o-Xylene	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.

Quanex Corporation - Sampled September 27th, 1993

			MID	082	767	591			
Inorganics (ppm)		MW-1A	MW-1C	MW-2A	MW-3A	MW-7A	MW-7B	FB	
Alkalinity		289	339	206	786	275	285	<20	
Carbonate		<5	<5	<5	<5	<5	<5	<5	
Bicarbonate		289	339	206	786	275	285	<20	
Chloride		101	107	156	17	169	58	<1	
Diss. Arsenic		<.001	.0103	.003	.0037	.0068	.0148	<.001	
Diss. Barium									
Diss. Calcium		142	122	306	277	164	90.8	<1	
Diss. Cadmium		<.020	<.020	<.020	<.020	<.020	<.020	<.020	
Diss. Chromium		<.025	<.025	<.025	<.025	<.025	<.025	<.025	
Diss. Copper		<.020	<.020	<.020	<.020	<.020	<.020	<.020	
Diss. Iron		5	2.3	1.8	9.8	1.9	1.7	<.100	
Diss. Potassium		5.02	3.7	22.6	6.1	3.21	1.59	<.100	
Diss. Magnesium		14.4	28.1	43	43	16.7	30.3	<1	
Diss. Manganese		.270	.038	.470	.650	.240	.028	<.020	
Diss. Sodium		61.6	55.4	99.4	26.5	91.4	12.6	<1	
Diss. Nickel		<.050	<.050	<.050	<.050	<.050	<.050	<.050	
Diss. Lead		<.050	<.050	<.050	<.050	<.050	<.050	<.050	
Diss. Zinc		.340	<.050	<.050	<.050	<.050	<.050	<.050	
Sulfate		114	47	1076	53	148	41	<2	
Organics (ppb)									
Sedn. 8260									
1,1-Dichloroethane		ND	ND	17 J	ND	1.4 J	ND	ND	
1,1,1-Trichloroethane		ND	ND	ND	ND	3.9	ND	ND	

J = Estimated value; value may not be Accurate

EL 070
7/[redacted]/91
MATRIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

SAFETY WARNING
YES (NO) - INFO ON BACK

LAB ORDER# 9309164 PROJ CODE _____ PRIORITY II RECEIVED AT LAB BY ML DATE TIME 9/27/93 4:40 (PM)

SUBMITTER DIVISION WMD DISTRICT OR OFFICE Lansing H.W. Permits CONTACT PERSON FOR QUESTIONS Dave Slayton PHONE (517) - [redacted]373-8012

LOCATION SAMPLED Quaker COLLECTED BY La Seke / Slayton TRANS TO _____

COST CENTER 60026 SEND RESULTS TO ATTENTION OF Jan Sealock AT ADDRESS (if different than above office) H.W. Permits WMO Hannah Bldg, Lansing

SAMPLE REMARKS Groundwater

SAMPLE NUMBER	FIELD ID OR DESCRIPTION (25 Characters)	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MW-31A	930927	9:33	upgrad shallow
02	MW-1C	930927	10:25	upgrad, deep
03	MW-11A	930927	12:20	dngrd shallow
04	MW-13A	930927	8:42	dngrd shallow
05	MW-17A	930927	11:10	upgrad. shallow

GENERAL CHEMISTRY

DO Diss Oxygen ... 1 2 3 4 5
GN NO2, o-Phos ... 1 2 3 4 5
Residue SS 1 2 3 4 5
Residue TDS ... 1 2 3 4 5
..... 1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
..... 1 2 3 4 5
CA Chlorophyll ... 1 2 3 4 5
GA COD 1 2 3 4 5
TOC 1 2 3 4 5
NO3+NO2, NH3 .. 1 2 3 4 5
KJEL N, Tot P . 1 2 3 4 5
..... 1 2 3 4 5
GG Phenolics 1 2 3 4 5
GB Total CN 1 2 3 4 5
Free CN 1 2 3 4 5
..... 1 2 3 4 5

ORGANICS

(P01) #1 Halocarbons (1 2 3 4 5)
(P02) #2 Aromatic HC (1 2 3 4 5)
..... 1 2 3 4 5
ON #3 Chloro HC + Pest & PCB . 1 2 3 4 5
..... 1 2 3 4 5
OB GC/MS Base Neut 1 2 3 4 5
..... 1 2 3 4 5
OA #8 Phenols 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5

INORGANIC

MA Total Metals 1 2 3 4 5
(MAD) Diss-Field Filtered ... (1 2 3 4 5)
MD Diss-Lab Filtered 1 2 3 4 5
(Ca Mg Na K) ..... (1 2 3 4 5)
(Cd Cr Cu Ni Pb Zn) ... (1 2 3 4 5)
(Fe) Co Li (Mn) ..... (1 2 3 4 5)
Al (Ba) Be Mo Ti V ..... (1 2 3 4 5)
..... 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
..... 1 2 3 4 5
LOW LEVEL Ag 1 2 3 4 5
" " (As) ..... (1 2 3 4 5)
" " Cd Cr Cu Ni Pb 1 2 3 4 5
" " Zn Fe..... 1 2 3 4 5
(MN) pH, Conductance 1 2 3 4 5
(Cl, SO4, Total Alk ..) (1 2 3 4 5)
(HCO3- CO3=) ..... (1 2 3 4 5)
CR+6 ..... 1 2 3 4 5
..... 1 2 3 4 5
OG Oil and Grease 1 2 3 4 5

Initial to indicate that you will accept "HT" coded results for late arriving samples.

EL 070
7/88 91
MATRIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

SAFETY WARNING
YES / (NO) - INFO ON BACK

LAB ORDER# 9309164 PROJ CODE _____ PRIORITY II RECEIVED AT LAB BY ML DATE TIME 9/27/93 14:40 (PM) AM

SUBMITTER DIVISION WMD DISTRICT OR OFFICE Lansing HW Permits CONTACT PERSON FOR QUESTIONS Dave Stanton PHONE (517) - 373-8029

LOCATION SAMPLED Quarry COLLECTED BY LaSelle/Stanton TRANS TO _____

COST CENTER 60026 SEND RESULTS TO ATTENTION OF Jan Seabolt AT ADDRESS H.W. Permits WMD Hannah Bldg, Lansing (if different than above office)

SAMPLE REMARKS Groundwater

SAMPLE NUMBER	FIELD ID OR DESCRIPTION (25 Characters)	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
06	MW-17B	930927	11:35	upgrad. day
07	FB	930927	11:30	Field Blank
03				
04				
05				

GENERAL CHEMISTRY (=J=)

DO Diss Oxygen ... 1 2 3 4 5

(-K-)

GN NO2, o-Phos ... 1 2 3 4 5
Residue SS 1 2 3 4 5
Residue TDS ... 1 2 3 4 5
..... 1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
..... 1 2 3 4 5

(-Q-)

CA Chlorophyll ... 1 2 3 4 5

(-L-)

GA COD 1 2 3 4 5
TOC 1 2 3 4 5
NO3+NO2, NH3 .. 1 2 3 4 5
KJEL N, Tot P . 1 2 3 4 5
..... 1 2 3 4 5

(-M-)

GG Phenolics 1 2 3 4 5

(-N-)

GB Total CN 1 2 3 4 5
Free CN 1 2 3 4 5

..... 1 2 3 4 5

ORGANICS (=R=)

(P01) #1 Halocarbons (1) 2 3 4 5
(P02) #2 Aromatic HC (1) 2 3 4 5
..... 1 2 3 4 5

(-S-)

ON #3 Chloro HC + Pest & PCB . 1 2 3 4 5
..... 1 2 3 4 5

(-T-)

OB GC/MS Base Neut 1 2 3 4 5
..... 1 2 3 4 5

(-U-)

OA #8 Phenols 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5

(-V-)

INORGANIC (=X=)

MA Total Metals 1 2 3 4 5
(MAD) Diss-Field Filtered ... (1) 2 3 4 5
MD Diss-Lab Filtered 1 2 3 4 5

(Ca Mg Na K) ..... (1) 2 3 4 5
(Cd Cr Cu Ni Pb Zn) ... (1) 2 3 4 5
(Fe Co Li Mn) ..... (1) 2 3 4 5
Al (Ba) Be Mo Ti V ..... (1) 2 3 4 5
..... 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
..... 1 2 3 4 5
LOW LEVEL Ag 1 2 3 4 5
" " (As) ..... (1) 2 3 4 5
" " Cd Cr Cu Ni Pb 1 2 3 4 5
" " Zn Fe..... 1 2 3 4 5

(-Y-)

(MN) pH, Conductance 1 2 3 4 5
(Cl, SO4, Total Alk) ... (1) 2 3 4 5
(HCO3- CO3=) ..... (1) 2 3 4 5
CR+6 ..... 1 2 3 4 5
..... 1 2 3 4 5

OG Oil and Grease ..... 1 2 3 4 5 (-Z-)

Initial to indicate that you will accept "HT" coded results for late arriving samples.

Monitor Well Data Sheets

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WASTE MANAGEMENT DIVISION

Q & M MONITOR WELL & GROUND WATER DATA SHEET

Facility: Quanex Location: South Lyon

Type of Facility: seamless tube manufacture

Contact: Donald Comfort Phone: ( )

WELL INFORMATION

Name/Number: MW-1A Cap Locked: Yes ✓ No ___

Depth: ___ Casing Material: galv.

Diameter: 2" Screen Slot Size: ___

Casing Ht. Above Ground: ≈3' Screen Length: ___

Top of Casing Elev.: ___ Screen Material: ___

Protective Barrier: No Screen Packed: Yes ___ No ___

Concrete Pad: Yes ✓ No ___ Well Condition: good

Elevation of Screened Interval: ___ to ___

Location of TOC Survey Mark: none

Measured from latch on permanent metal outer casing (as reference)

WWES: J. Wooster

SAMPLING INFORMATION Sampled: 9:33

	DNR	FACILITY
Initial Static Water Level:	12.66	12.61
Method:	Elec. tape	Elec. Tape
Measured By:	Slayton	Jim
Stabilized pH:	6.74	6.93
Stabilized Conductance:	1150	928
Temperature:		13.6°

Purge Method: polyethylene bailer Vol. Purged: 3 gallons

Fate of Purge Water: bucket (graduated) dumped on ground away from well

Recovery Rate: good Appearance: clear (became silty, brown

Sampling Method: poly bailer Appearance: clear

Staff Present: Wooster, Slayton Date: 9-27-93

Standing Water: Y (N) Frost Heaving: Y (N)

Collision Damage: Y (N) Well Subsidence: Y (N)

Casing Degredation: Y (N) Photograph Taken: Y (N)

Additional Notes: MW-1B = 14.33' static (14.35 WWES)

No sounding taken

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WASTE MANAGEMENT DIVISION

O & M MONITOR WELL & GROUND WATER DATA SHEET

Facility: QUANEX Location: South Lyon

Type of Facility: seamless tube manufacturer

Contact: Donald Comfort Phone: ( )

WELL INFORMATION

Name/Number: MW-1C (Dup) Cap Locked: Yes ✓ No ___
Depth: ___ Casing Material: PVC
Diameter: 2" Screen Slot Size: ___
Casing Ht. Above Ground: ~3' Screen Length: ___
Top of Casing Elev.: ___ Screen Material: ___
Protective Barrier: YR Screen Packed: Yes ___ No ___
Concrete Pad: Yes ✓ No ___ Well Condition: good
Elevation of Screened Interval: ___ to ___
Location of TOC Survey Mark: none

SAMPLING INFORMATION Sampled 10:25

	DNR	FACILITY
Initial Static Water Level:	14.19	14.19
Method:	~~Elec~~ Elec	Elec
Measured By:	Stanton	Jim
Stabilized pH:	6.88	6.92
Stabilized Conductance:	1080	~~1080~~ 950
Temperature:		12.5°

Purge Method: Polyethylene bailer Vol. Purged: 3½ gallons
Fate of Purge Water: ___
Recovery Rate: good Appearance: clear
Sampling Method: Poly bailer Appearance: clear
Staff Present: Woodle/Stanton/Wooster Date: 9/17/93

Standing Water: Y (N) Frost Heaving: Y (N)
Collision Damage: Y (N) Well Subsidence: Y (N)
Casing Degredation: Y (N) Photograph Taken: Y (N)

Additional Notes: no sounding taken

no sounding taken

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WASTE MANAGEMENT DIVISION

O & M MONITOR WELL & GROUND WATER DATA SHEET

Facility: Tuaneq Location: South Lyon

Type of Facility: seamless tube manufacturer

Contact: Donald Comfort Phone: ( )

WELL INFORMATION

Name/Number: MW-11A Cap Locked: Yes ✓ No ___
Depth: ___ Casing Material: PVC
Diameter: 2" Screen Slot Size: ___
Casing Ht. Above Ground: 2½ ft Screen Length: ___
Top of Casing Elev.: ___ Screen Material: ___
Protective Barrier: N ✓ Screen Packed: Yes ___ No ___
Concrete Pad: Yes ___ No ✓ Well Condition: good
Elevation of Screened Interval: ___ to ___
Location of TOC Survey Mark: none

SAMPLING INFORMATION Sampled: 12:20

	DNR	FACILITY
Initial Static Water Level:	15.40ft	15.45ft
Method:	electric tape	→
Measured By:	Slayton	Wooster
Stabilized pH:	6.84	7.22
Stabilized Conductance:	2140	1704
Temperature:		12.4°

Purge Method: Polythylene bailer Vol. Purged: 5.75 gallons
Fate of Purge Water: ground water bucket dumped on ground
Recovery Rate: good Appearance: slight sed.
Sampling Method: poly bailer Appearance: clear
Staff Present: Scott Slayton / Wooster Date: 9-27-93

Standing Water: Y/(N) Frost Heaving: Y/(N)
Collision Damage: Y/N Well Subsidence: Y/(N)
Casing Degredation: Y/(N) Photograph Taken: Y/(N)

Additional Notes: ___

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WASTE MANAGEMENT DIVISION

O & M MONITOR WELL & GROUND WATER DATA SHEET

Facility: Quaker Location: South Lyon

Type of Facility: SEAMLESS TUBE MANUFACTURE

Contact: Donald Comfort Phone: ( )

WELL INFORMATION

Name/Number: MW-13A
Depth: 21.5
Diameter: 2"
Casing Ht. Above Ground: ≈3'
Top of Casing Elev.: _____
Protective Barrier: _____
Concrete Pad: Yes ___ No ___
Elevation of Screened Interval: _____ to _____
Location of TOC Survey Mark: no reference mark on riser
WWES measured at notch on outer casing

Cap Locked: Yes V No ___
Casing Material: PVC
Screen Slot Size: _____
Screen Length: _____
Screen Material: _____
Screen Packed: Yes ___ No ___
Well Condition: _____

SAMPLING INFORMATION Sample taken 8:42

WWES staff
Jim Wooster

	DNR	FACILITY
Initial Static Water Level:	11.19	11.20
Method:	electric meter	electric meter
Measured By:	Slayton	Jim W
Stabilized pH:	6.35	~~6.35~~ 6.84
Stabilized Conductance:	1650	1312
Temperature:		11.40

Purge Method: Bailer Vol. Purged: 5 gal
Fate of Purge Water: bucket dumped on ground
Recovery Rate: good Appearance: cloudy grayish
Sampling Method: Bailer Appearance: clear
Staff Present: T. Slayton, LOSELLE Date: 9-27-93

Standing Water: Y (N)
Collision Damage: Y (N)
Casing Degredation: Y (N)
Frost Heaving: Y (N)
Well Subsidence: Y (N)
Photograph Taken: Y (N)

Additional Notes: MW-13B 14.68' static
MW-13C 13.93 static
no sounding of well taken

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WASTE MANAGEMENT DIVISION

O & M MONITOR WELL & GROUND WATER DATA SHEET

Facility: Jusep Location: South Lyon

Type of Facility: Seamless tube manufacture

Contact: Donald Comfort Phone: ( )

WELL INFORMATION

Name/Number: MW-17A
Depth: 23.2'
Diameter: 2"
Casing Ht. Above Ground: ~3'
Top of Casing Elev.: ____
Protective Barrier: yes
Concrete Pad: Yes ___ No ___
Elevation of Screened Interval: ____ to ____
Location of TOC Survey Mark: none

Cap Locked: Yes ✓ No ___
Casing Material: PVC
Screen Slot Size: ____
Screen Length: ____
Screen Material: ____
Screen Packed: Yes ___ No ___
Well Condition: ____

SAMPLING INFORMATION Sampled: 11:10

	DNR	FACILITY
Initial Static Water Level:	12.64 ft	12.66 ft
Method:	electric meter	electric meter
Measured By:	Slayton	J. Wooster
Stabilized pH:	~~6~~ 6.86	6.94
Stabilized Conductance:	135C	1156
Temperature:		12.40

Purge Method: Polyethylene bailer Vol. Purged: 5½ gallons
Fate of Purge Water: Graduated bucket dumped on ground
Recovery Rate: ____ Appearance: ____
Sampling Method: Poly bailer Appearance: clear
Staff Present: Wooster/Slayton/Wooster Date: 9-27-93

Standing Water: Y (N) Frost Heaving: Y (N)
Collision Damage: Y (N) Well Subsidence: Y (N)
Casing Degredation: Y (N) Photograph Taken: Y (N)

Additional Notes: Depth 23.2 ft.

M

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WASTE MANAGEMENT DIVISION

O & M MONITOR WELL & GROUND WATER DATA SHEET

Facility: Quanex Location: South Lyon

Type of Facility: Seamless tube manufacture

Contact: Donald Comfort Phone: ( )

WELL INFORMATION

Name/Number: MW-17B
Depth: 74½'
Diameter: 2"
Casing Ht. Above Ground: 2.3ft
Top of Casing Elev.:
Protective Barrier: yes
Concrete Pad: Yes ___ No ___
Elevation of Screened Interval: ___ to ___
Location of TOC Survey Mark: none

Cap Locked: Yes ✓ No ___
Casing Material: PVC
Screen Slot Size:
Screen Length:
Screen Material:
Screen Packed: Yes ___ No ___
Well Condition:

SAMPLING INFORMATION Sampled: 11:50

	DNR	FACILITY
Initial Static Water Level:	15.22ft	15.25ft
Method:	electric tape	electric tape
Measured By:	Slayton	Wooten
Stabilized pH:	6.90	7.11
Stabilized Conductance:	790	727
Temperature:		11.80

Purge Method: polyethylene tube Vol. Purged: 30½ gallons
Fate of Purge Water: graduated bucket dumped on ground
Recovery Rate: ___ Appearance: ~~rusty~~ clear
Sampling Method: Poly bailer Appearance: clear
Staff Present: Scott Slayton / Wooten Date: 9-27-93

Standing Water: Y (N) Frost Heaving: Y (N)
Collision Damage: Y (N) Well Subsidence: Y (N)
Casing Degredation: Y (N) Photograph Taken: Y (N)

Additional Notes: 74½ ft depth

Groundwater Contour Map

O&M INSPECTION
QUANEX CORPORATION
MID 082 767 591

GROUNDWATER CONTOUR MAP

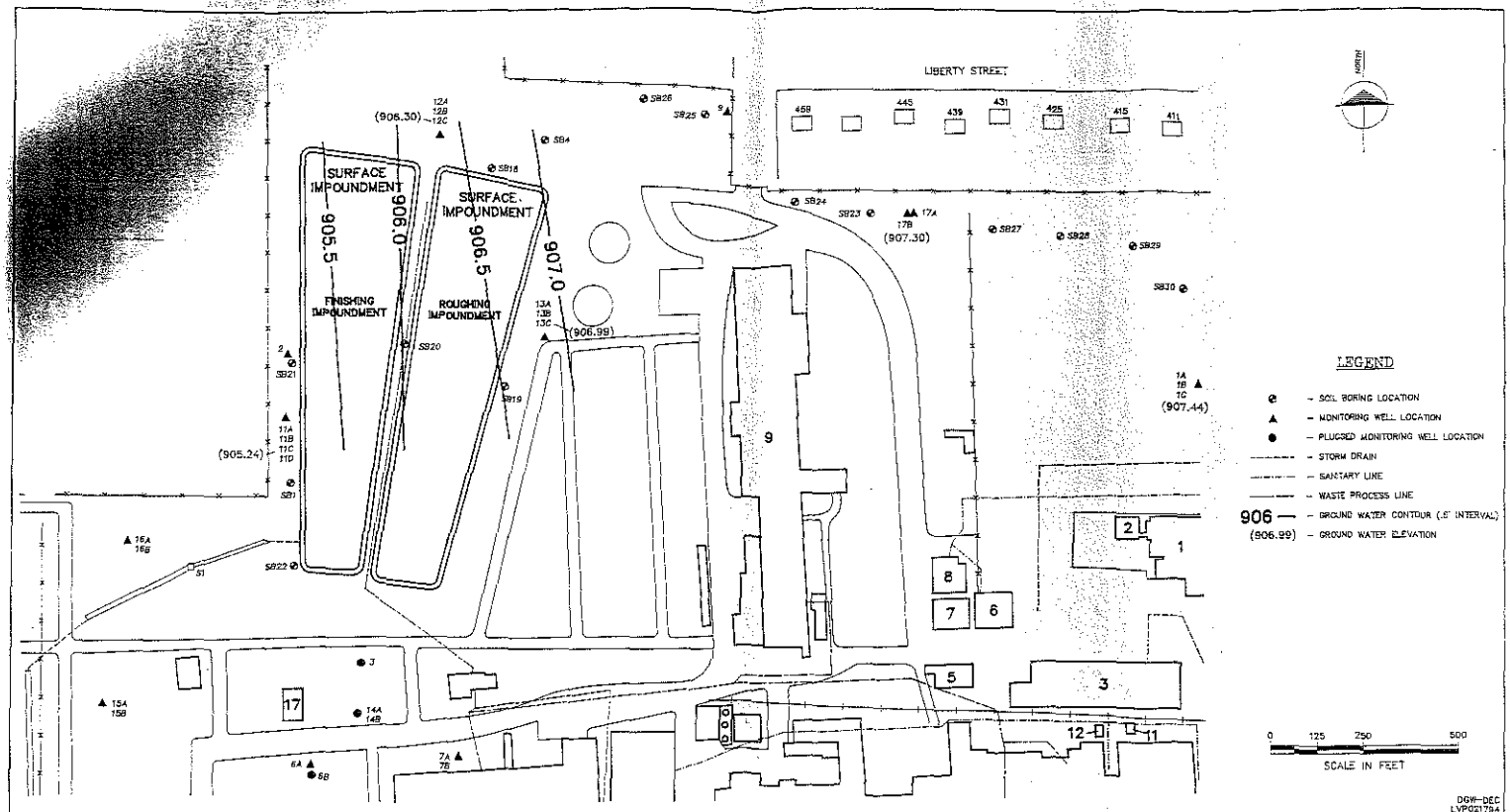
Groundwater elevations were measured by both the consultant (WWES) and the MDNR. The static water levels measured were in good agreement, and are listed below.

STATIC WATER LEVELS MEASURED 9/27/93 (feet)

Well ID.	Top of Casing	Michigan DNR	WWES	Michigan DNR GW Elevation
MW-1A	921.54	12.66	12.61	908.88
MW-1C	921.58	14.19	14.19	907.39
MW-11A	921.00	15.40	15.45	905.60
MW-13A	920.52	11.19	11.20	909.33
MW-17A	921.80	12.64	12.66	909.16
MW-17B	922.32	15.22	15.25	907.10

These groundwater elevations are similar to those measured on December 10, 1993, by WW Engineering & Science (WWES). Since the static water level measurements by the consultant are acceptable, groundwater contour maps presented in the Annual Groundwater Report for 1993 are included to show the site groundwater flow direction.

The upper and lower portion of the glacial drift aquifer have different groundwater flow directions. The upper part of this unconfined aquifer flows south/southwest, while the lower portion flows westerly. Both directions are consistent with historic data.

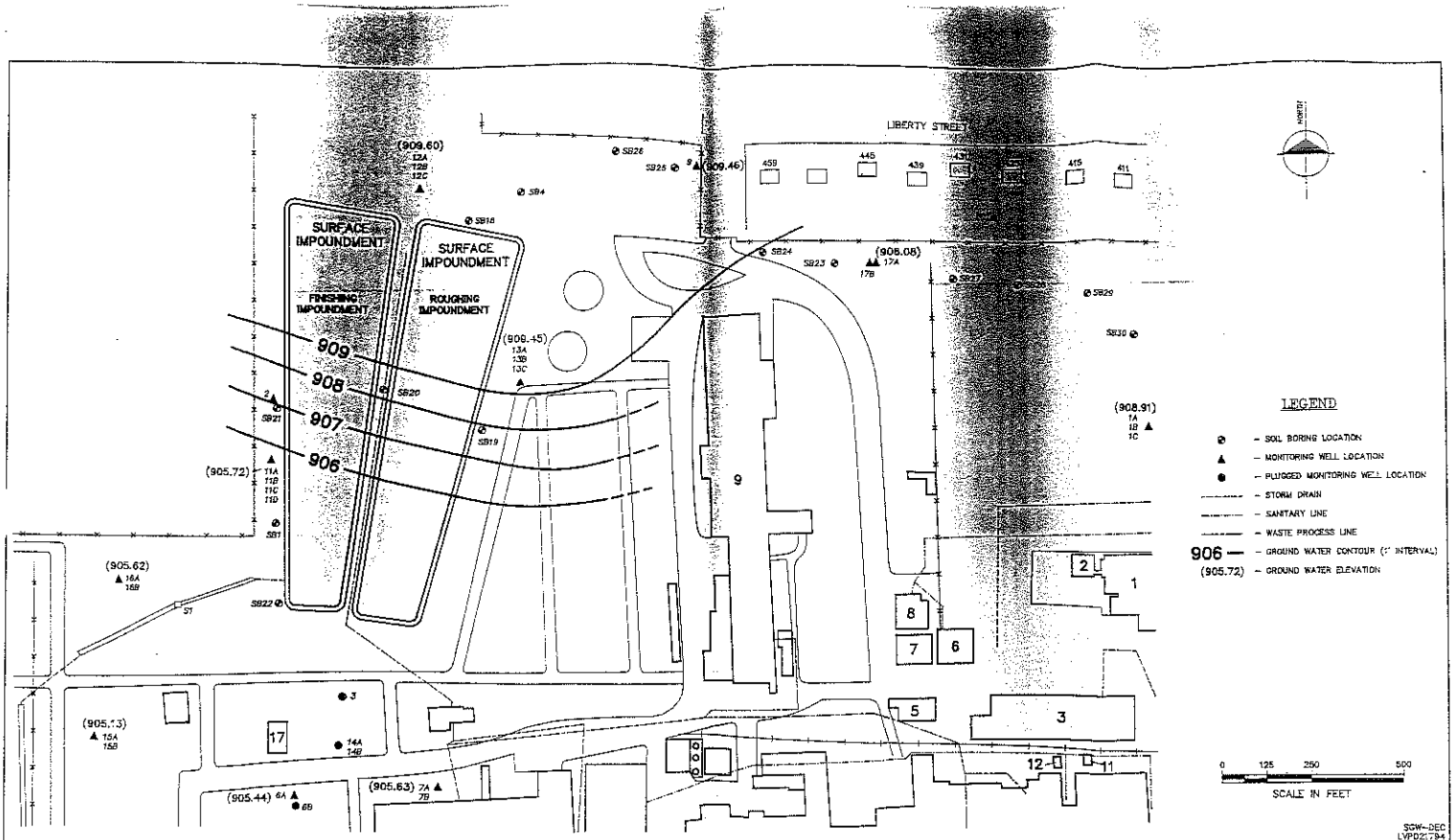


DGW–DEC
LVP021784

FIGURE 2
DEEP WELLS
GROUND WATER CONTOUR MAP
(MEASUREMENTS MADE 12–10–93)
QUANEX CORPORATION
MICHIGAN SEAMLESS TUBE DIVISION
SOUTH LYON, MICHIGAN
FEBRUARY, 1994 20515.01

Annual 1993 Monitoring Summary Report
Feb. 28, 1994

WW Engineering & Science



Annual 1993 Monitoring Summary Report
Feb. 28, 1994

WW Engineering & Science

FIGURE 1
SHALLOW WELLS
GROUND WATER CONTOUR MAP
(MEASUREMENTS MADE 12-10-93)
QUANEX CORPORATION
MICHIGAN SEAMLESS TUBE DIVISION
SOUTH LYON, MICHIGAN
FEBRUARY, 1994 20515.01

SGW-DEC
LVPDZ:794

Additional Reviews

O&M INSPECTION
QUANEX CORPORATION
MID 082 767 591

GROUNDWATER QUALITY - STIFF/PIPER DIAGRAMS

GROUNDWATER QUALITY

The primary focus of the split sampling was upgradient wells. The intent was to sample some of these newer wells and to confirm arsenic concentrations in the upgradient aquifer. Monitor wells MW-1A (shallow), MW-1C (deep), MW-17A (shallow), and MW-17B (deep) are upgradient. Wells MW-11A and MW-13A are adjacent to the surface impoundments.

Arsenic concentrations in the upgradient wells range from <0.001 to 0.0148 mg/l. Arsenic in the two downgradient wells that the MDNR split sampled were 0.003 and 0.0037 mg/l. Zinc was detected in upgradient well MW-1A at 0.340 mg/l while all others were less than 0.05 mg/l.

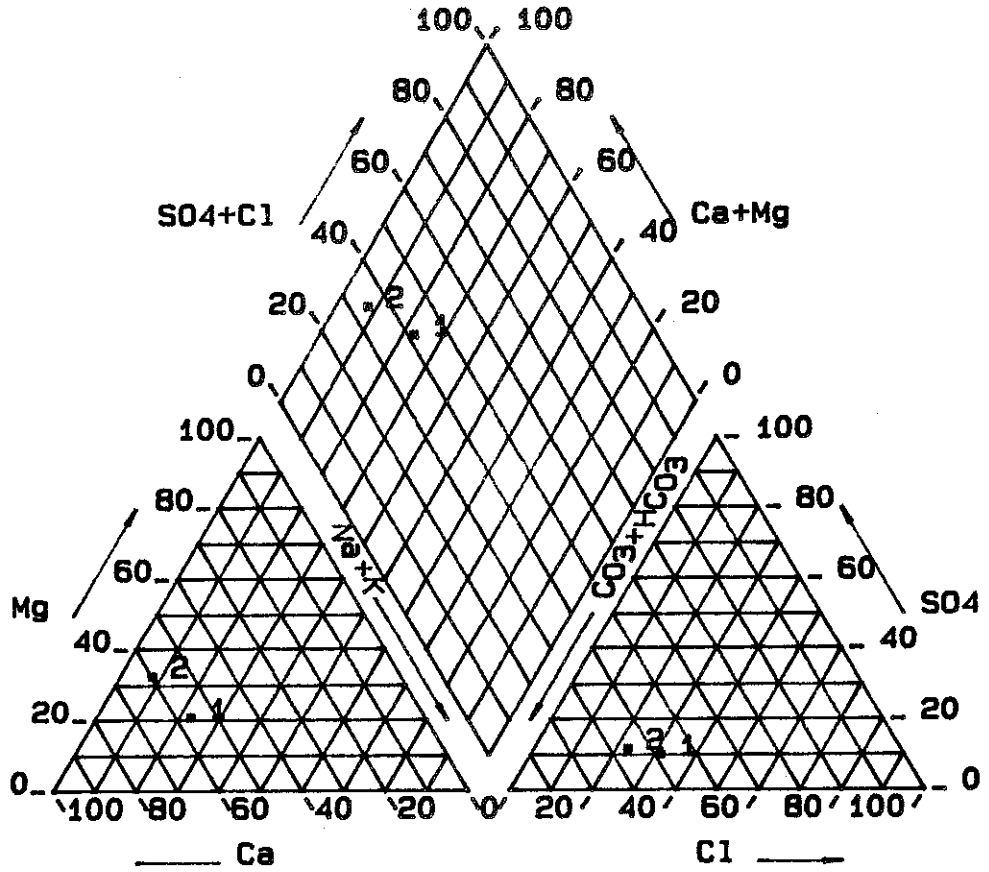
The arsenic concentrations in the four upgradient wells sampled were found to be consistent with the data set used for establishing background between August 1991 and June 1992. In 1993, only well MW-6A was found to have statistically significant concentrations of arsenic higher that the background. This well is not adjacent to the surface impoundment, and the arsenic is attributed to other sources since wells next to the impoundments do not show significant levels or arsenic.

STIFF/PIPER DIAGRAMS

Analysis of the major ions was done using Stiff and Piper diagrams, along with Pie charts and bar graphs. These analyses show that the four upgradient wells sampled are similar in general chemistry. The two downgradient wells that are adjacent to the surface impoundments do show an impact. Well MW-11A has a relatively higher concentration of sulfate in the MDNR sample, while MW-13A has a higher concentration of bicarbonate. This can be seen for example on Figure 2, the Piper diagram where wells labeled "2" (MW-11A) and "3" (MW-13A) plot in areas away from the other wells.

Piper Diagram

#	Date YYMMDD	Zone	Well I.D.
1	930827	1, 3, 5	MW1C
2	930827	1, 3, 5	MW17B

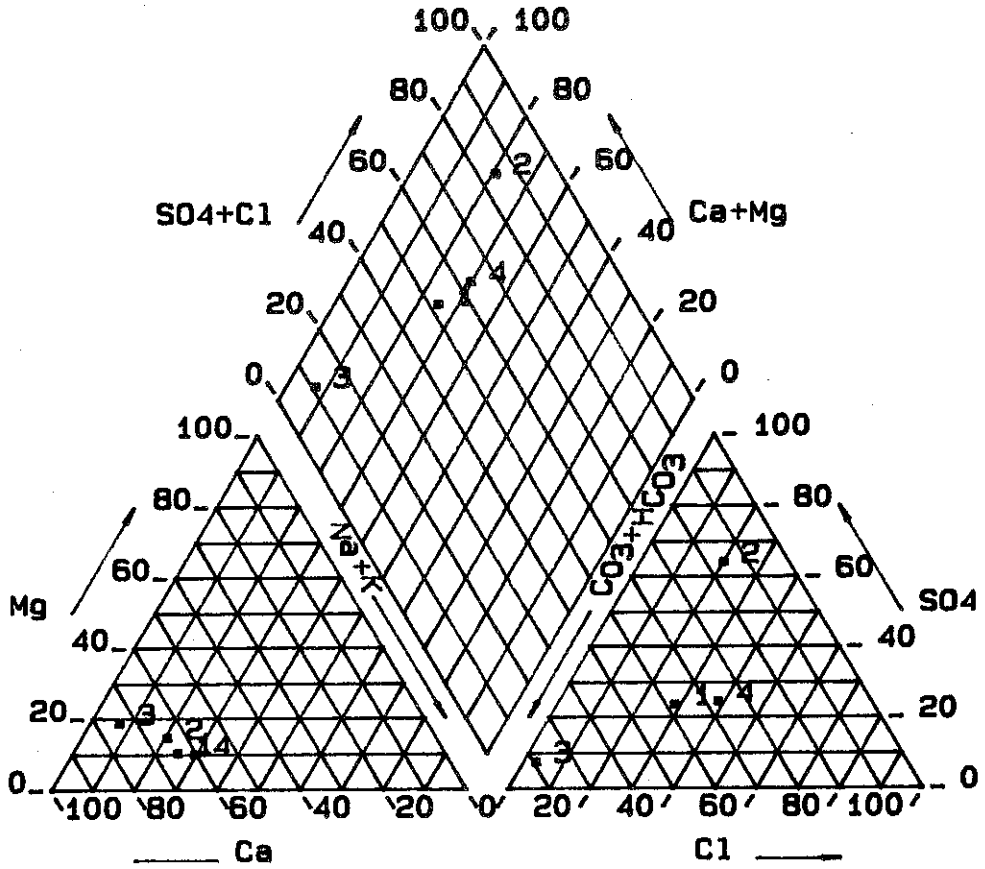


MDNR - WASTE MANAGEMENT DIVISION

Figure : 1

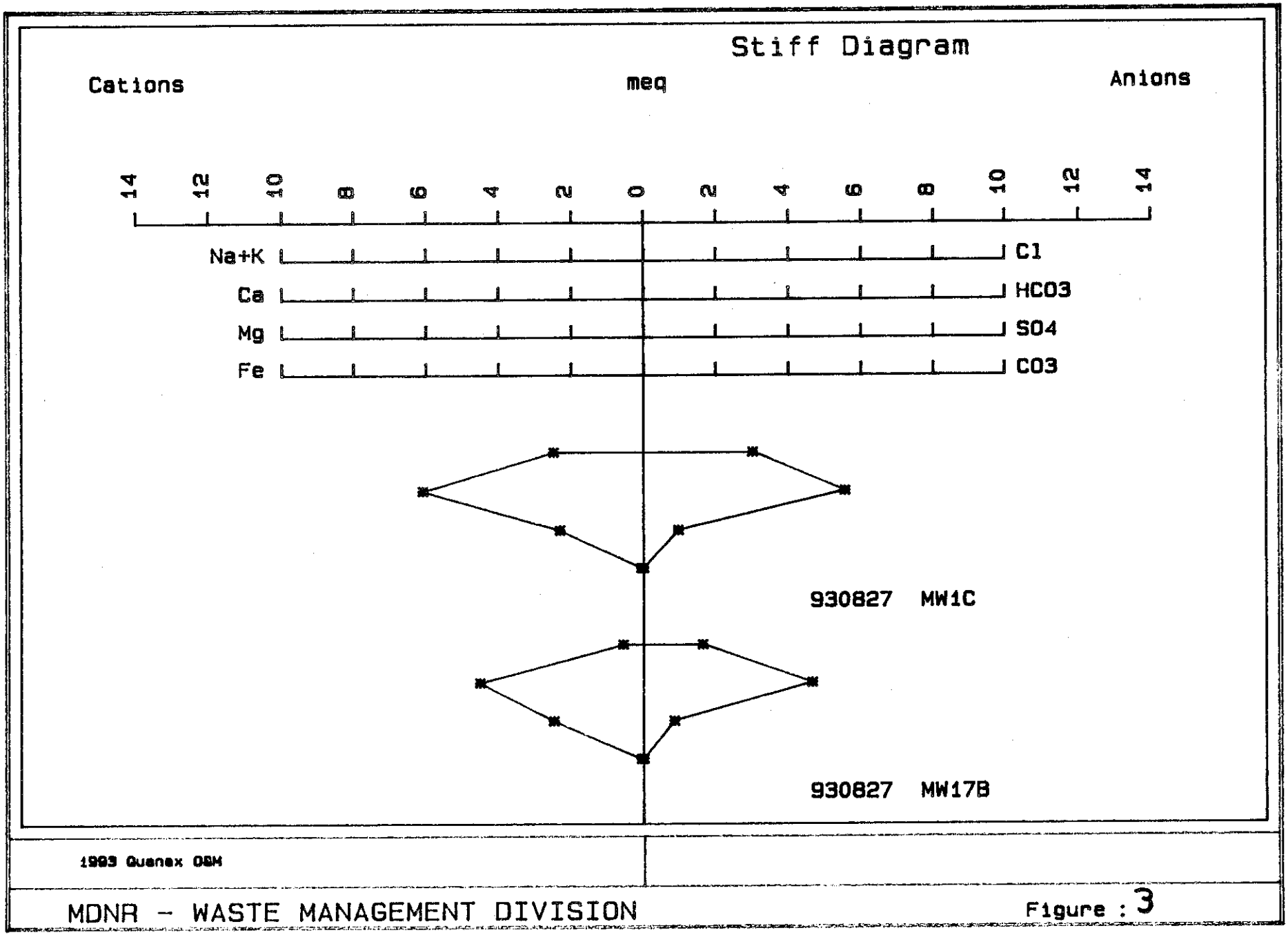
Piper Diagram

#	Date YYMMDD	Zone	Well I.D.
1	930827	1, 4, 9	MW1A
2	930827	1, 4, 6	MW11A
3	930827	1, 3, 5	MW13A
4	930827	1, 4, 9	MW17A



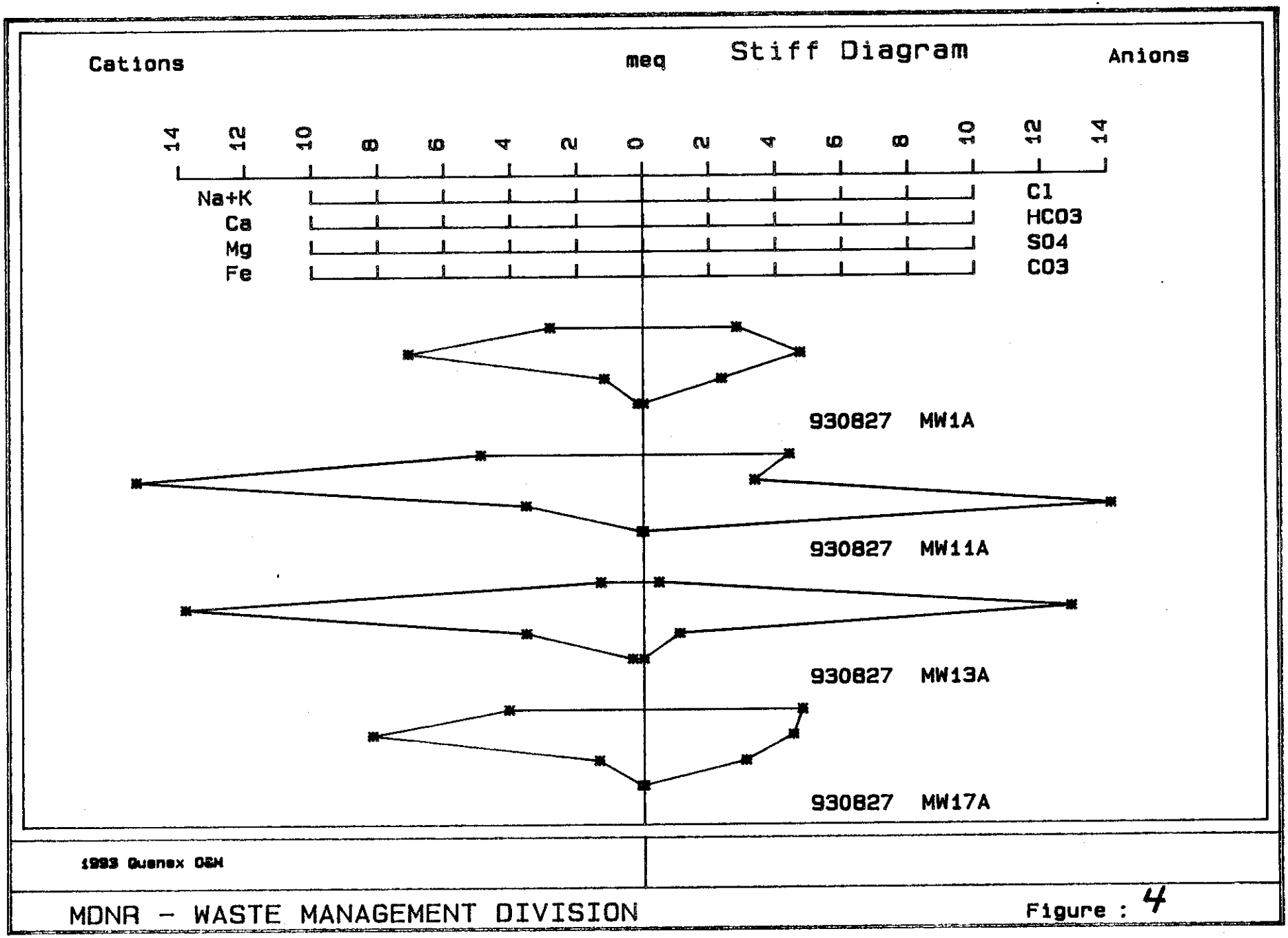
MDNR – WASTE MANAGEMENT DIVISION

Figure : 2



MDNR - WASTE MANAGEMENT DIVISION

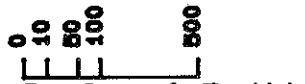
Figure : 3



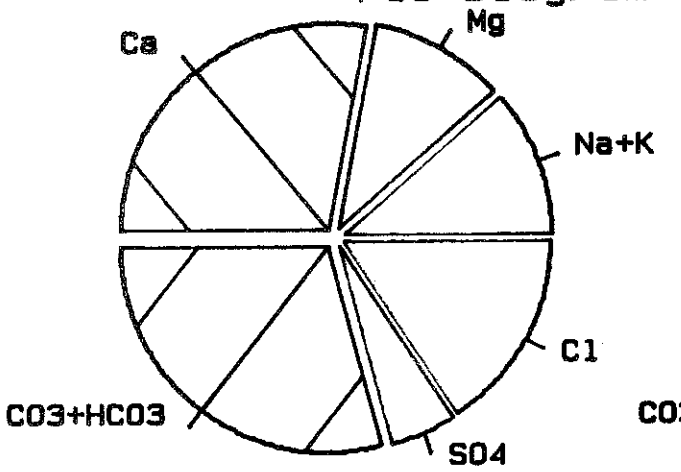
MDNR – WASTE MANAGEMENT DIVISION

Figure : 4

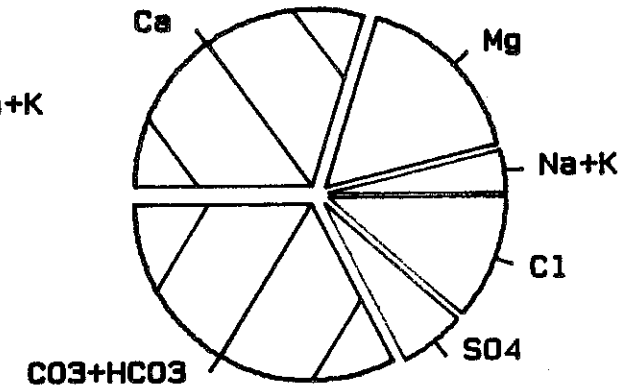
Pie Diagram



Scale of Radii
Area of circle indicates concentration in mg/l



930827 MW1C



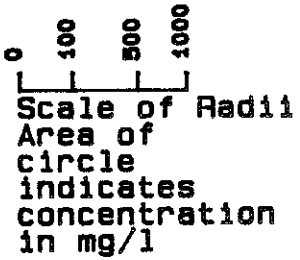
930827 MW17B

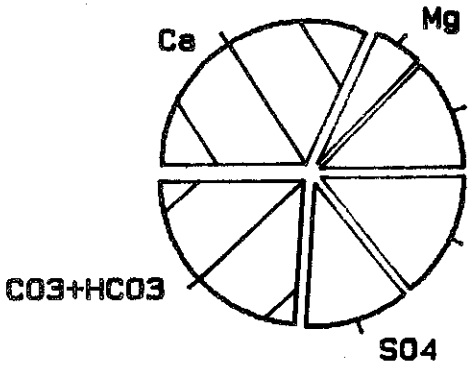
1993 Quanex O&M

MDNR - WASTE MANAGEMENT DIVISION

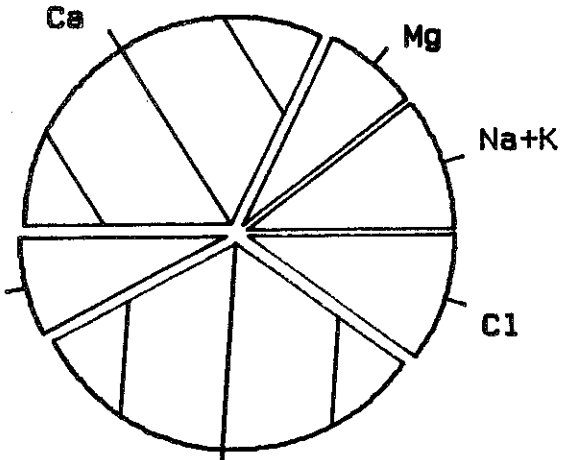
Figure : 5

Pie Diagram

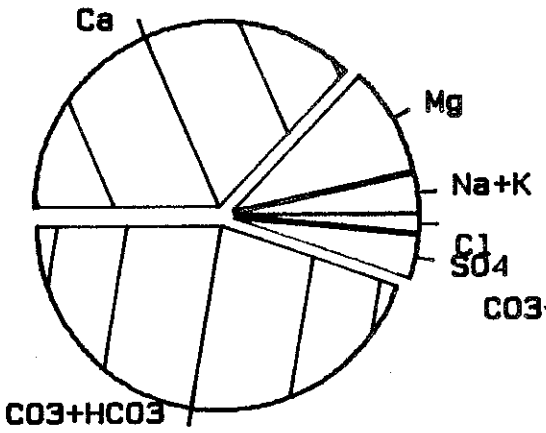




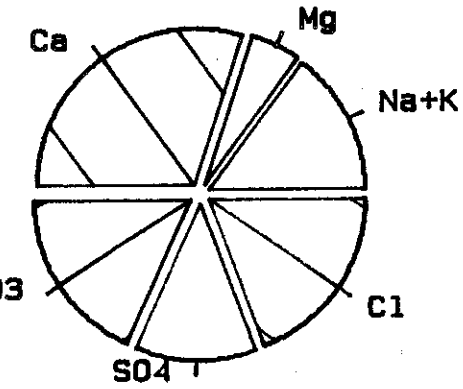
930827 MW1A



930827 MW11A



930827 MW13A



930827 MW17A

MDNR - WASTE MANAGEMENT DIVISION

Figure : 6

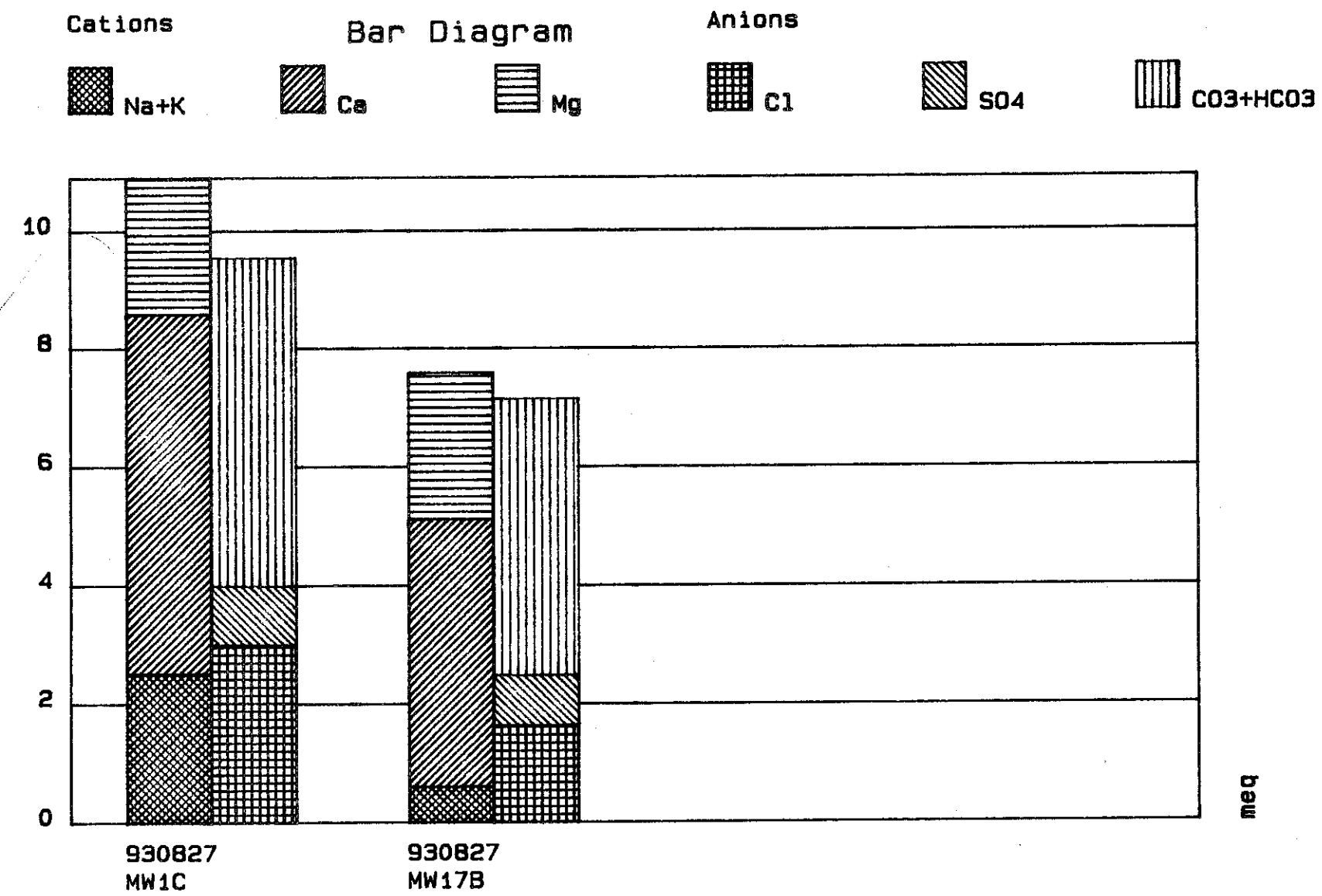
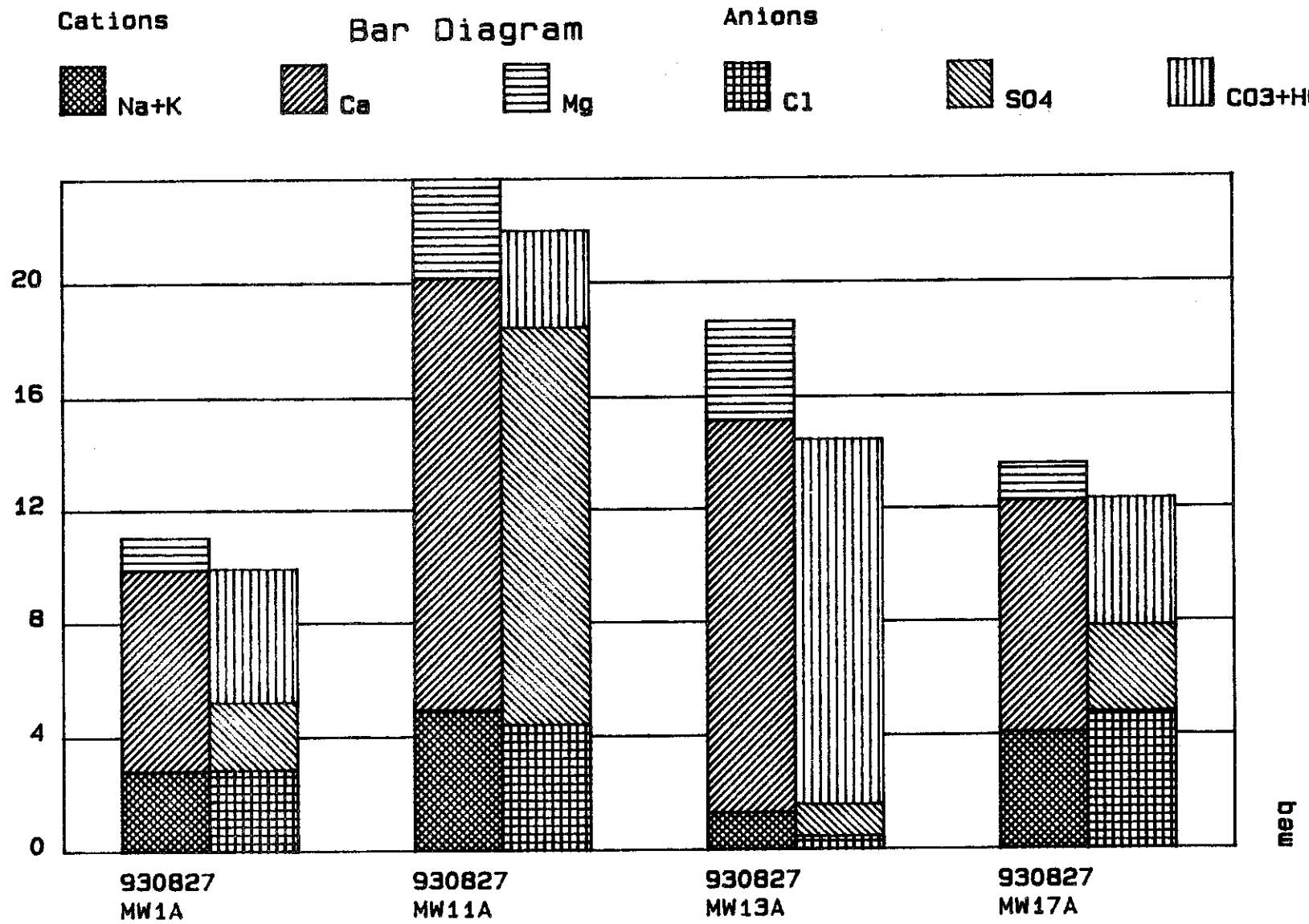

Cations
Bar Diagram
Anions
Na+K
Ca
Mg
Cl
SO4
CO3+HCO3
10
8
6
4
2
0
meq
930827
MW1C
930827
MW17B

FIG. 7



MDNR – WASTE MANAGEMENT DIVISION

Figure : 8

DATA COMPARISON: QUANEX VS MDNR

Inorganics (ppm)	MW-1A		MW-1C		MW-11A		MW-13A		MW-17A		MW-17B	
	Quanex	MDNR	Quanex	MDNR	Quanex	MDNR	Quanex	MDNR	Quanex	MDNR	Quanex	MDNR
Chloride	106	101	116	107	172	156	20	17	187	275	59	58
Diss. Arsenic	0.0012	<.001	<.001	0.0103	0.0025	0.003	0.0045	0.0037	0.0062	0.0068	0.016	0.0148
Diss. Cadmium	<.010	<.020	<.010	<.020	<.010	<.020	<.010	<.020	<.010	<.020	<.010	<.020
Diss. Chromium	<.050	<.025	<.050	<.025	<.050	<.025	<.050	<.025	<.050	<.025	<.050	<.025
Diss. Copper	<.010	<.020	<.010	<.020	<.010	<.020	<.010	<.020	<.010	<.020	<.010	<.020
Diss. Iron	5	5	2.43	2.3	2.03	1.8	10	9.8	1.9	1.9	2.07	1.7
Diss. Manganese	0.31	0.27	0.047	0.038	0.49	0.47	0.72	0.65	0.28	0.24	0.027	0.028
Diss. Lead	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050
Sulfate	124	114	57	47	755	676	30	53	150	148	47	41
Organics (ppb)												
Dichloroethane(1,1)	<1	<1	<1	<1	5.4	17	<1	<1	<1	1.4	<1	<1

The MDNR data for 1,1-Dichloroethane in MW-11A and MW-17A are estimated values; the value may not be accurate

The data comparison shows very good correlation between the two laboratories for all wells and all parameters. Two of the parameters chloride and sulfate remain above recently calculated Type B standards. The following wells exceed the Type B criteria:

Parameter	Well	Concentration(ppm)	Type B Level(ppm)
Chloride	17A	275 (MDNR)	250 aesthetic value
Sulfate	11A	755 (QUANEX)	250 aesthetic value
	11A	676 (MDNR)	250 aesthetic value

Summary Letter

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES
John Hannah Building, P.O. Box 30241, Lansing, MI 48909

ROLAND HARMES, Director

March 23, 1994

Mr. Donald Comfort
Engineering Manager
Quanex Corporation
400 McMunn
South Lyon, Michigan 48178

Dear Mr. Comfort:

Subject: Quanex 1993 O&M Report
MID 082 767 591

An O&M inspection has been conducted at the Quanex Corporation, of South Lyon. The inspection included a field audit and split sampling of groundwater (September 27, 1993), O&M checklist, sampling and analysis inspection, monitor well data sheets, groundwater contour map, stiff\piper\pie diagram, and data comparison.

The latest sampling and analysis plan for groundwater monitoring is located within the Groundwater Quality Assessment Program dated April of 1986. This was then approved with revisions on May 20, 1992 by the Michigan Department of Natural Resources.

The attachment to this memo lists one area of concern identified during the field inspection on September 27, 1993. The concern was that depth or sounding measurements were not taken for some of the wells. It is common for sediments to accumulate at the bottom of the well thus changing the depths of the well and the amount of water evacuated for purging. It is therefore, good practice to take depth measurements at each sampling event.

If there are any questions, please contact the number listed below or Mr. David Slayton at 517-373-8012.

Sincerely,

Jan Sealock

Jan Sealock
Environmental Quality Analyst
Waste Management Division
517-373-4740

cc/enc: Ms. De Montgomery/U.S. EPA Reporting
Mr. Ben Okwumabua, DNR-Livonia
Mr. Dave Slayton, DNR
HWP/C&E File

ATTACHMENT

Quanex Corporation
MID 082 767 591
O&M Inspection-1993

1). Depth or sounding measurements were not taken at some of the wells. This measurement should be taken at each sampling event. [Area of Concern].

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES
John Hannah Building, P.O. Box 30241, Lansing, MI 48909

ROLAND HARMES, Director

September 2, 1993

Mr. Donald Comfort
Engineering Manager
Quanex Corporation
400 McMunn
South Lyon, Michigan 48178

Dear Mr. Comfort:

SUBJECT: O&M Inspection
Quanex Corporation
MID 082 767 591

The Michigan Department of Natural Resources (Department) will be visiting Quanex Corporation on September 27, 1993 to conduct an Operation and Maintenance Inspection (O&M) of your groundwater monitoring system(s).

The O&M is an inspection which the Department conducts to follow up on the Comprehensive Monitoring Evaluation (CME) previously performed at your facility. Whereas the CME inspection was performed to evaluate the technical adequacy of your groundwater monitoring system(s), the O&M inspection is designed to evaluate the performance, operation, and maintenance of this system(s). The basis for the Department's review can be found in 1979 P.A. 64, as amended (Act 64), Part 10, Rule 299.11003(n), which references Part 265 Subpart F of the Resource Conservation and Recovery Act (RCRA), or the environmental monitoring requirements contained in your current Act 64 operating license.

Prior to visiting the site, staff will be reviewing your Sampling and Analysis Plan (SAP) so that they can determine in the field whether your on-site sampling methods comply with the groundwater sampling and handling procedures specified in your SAP and/or permit. In order for our office to accurately perform this pre-inspection review, Waste Management Division (WMD) staff will contact you by telephone to verify whether we have a current copy of your SAP. If we find during that conversation that the WMD does not have one, you will need to submit a copy of your current SAP by September 22, 1993 to:

Jan Sealock
Michigan Department of Natural Resources
Waste Management Division

Jan 5.

Corporation
n Seamless Tube Division
Muno
n Lyon, Michigan 48178

Quanex Michigan Seamless Tube Division

RECEIVED

APR 15 1991

Waste Management Division

April 12, 1991

Mr. Christopher L. Silva
Michigan Department of Natural Resources
S.E. Michigan District Headquarters
Waste Management Division
38980 Seven Mile Road
Livonia, MI 48152

RECEIVED
JUL 24 1991
OFFICE OF RCRA
Waste Management Division
U.S. EPA, REGION V

CERTIFIED MAIL - P 066 446 676

RE: QUANEX CORPORATION - MID 082 767 591
RESPONSE TO O&M INSPECTION LETTER

Dear Mr. Silva:

The purpose of this letter is to address the issues raised by the MDNR's O&M Inspection at our plant on December 20, 1990. Your letter to me of March 12, 1991, which discusses the results of that inspection, divides the MDNR's concerns into three categories; this response addresses each category in turn.

First, your letter requested five specific changes to the sampling and analysis plan. In cooperation with the MDNR, Quanex is providing revised pages for insertion into the plan which, as requested, thoroughly document the current monitoring procedures. One copy of the revised pages are included in Attachment 1. These pages address all of the issues raised by the MDNR and should replace the current pages as described on the yellow cover sheet.

Nonetheless, Quanex does not believe that the absence of this additional information represents any violation of 40 CFR 265.92(a) or any portions of Michigan Act 64. The monitoring plan was approved by the Environmental Protection Agency in a letter from Mr. William Muno to me dated September 4, 1986. We note that the cited sections of 40 CFR 265.92(a) do not specify that the requested information be included. In accordance with the applicable regulations, the existing plan "included procedures and techniques for (1) sample collection; (2) sample preservation and shipment; (3) analytical procedures; and (4) chain-of-custody control." [40 CFR 265.92(a)]. Moreover, contrary to the O&M inspection report, the MDNR did not send us a post-inspection report notifying us of these "deficiencies" in connection with the 1988 CME. Thus, we object to the MDNR's characterization of the existing plan provisions as being in "violation" of the relevant regulations.

Second, your March 12 letter requested a proposal for additional information to support the claim that the low concentrations of arsenic observed

outline used to check Sampling & Analysis Plan

SAMPLING AND ANALYSIS PLAN OUTLINE

- Locations sampled (include on a site map)
- Sampling frequency/schedule
- Parameters to be analyzed (based on an evaluation of the materials handled, and considering breakdown products)
- Sampling equipment
  - Method of operation
  - Compatibility with parameters to be analyzed
- Field measured parameters
  - Method(s) used
  - Calibration method and schedule
- Decontamination procedures
- Sample Handling
  - Containers used
  - Special precautions (volatiles, bactis, etc.)
  - Preservation techniques
  - Filtering procedures (where applicable)
- Sample Analysis
  - Identify laboratory(s) used
  - Analytical methods
    - Method reference
    - Holding time
    - Detection limit
- Quality Assurance/Quality Control Programs (QA/QC)
  - Field
    - Duplicate samples
    - Blanks - Trip
      - Air
      - Equipment
  - Laboratory
    - Spikes
    - Standards
    - Duplicates
- Chain of custody procedures
  - Sample labels
  - Field log
  - Sample shipment
  - Chain of custody form
- Static water levels
  - Measurement point
  - Measurement method
  - Level of accuracy
- Well purging
  - Purge volume determination calculations
  - Purge volume measurement
  - Fate of purge water
  - Purge method
- Sampling
  - Time elapsed after purging
  - Sampling method (suitability with parameters to be analyzed)
- Statistical evaluation

ERA

STATE OF MICHIGAN

JOHN ENGLER, [illegible], Governor

DEPARTMENT OF NATURAL RESOURCES

DAVID F. HALES, Director

S.E. MICHIGAN DISTRICT HEADQUARTERS
Waste Management Division
38980 Seven Mile Road
Livonia, MI 48152

March 12, 1991

Mr. Donald Comfort
Quanex Corporation
400 McMunn
South Lyon, MI 48178

Dear Mr. Comfort:

RE: Quanex Corporation, MID 082 767 591, O&M Inspection

On December 20, 1990, an O&M Inspection was completed by Dave Slayton and Jan Sealock, Geotechnical Support Unit, Waste Management Division. The report is enclosed with this letter. A summary memo in the report, dated February 27, 1991 details the attached listing of conclusions and violations.

Violations of the groundwater monitoring program have been found with the operation and reporting of this monitoring system pursuant to Act 64 P.A. 1979, as amended, Part 10, Rule 299.11003 referencing Part 265 Subpart F of RCRA. The groundwater monitoring program at Quanex Corporation should continue on a quarterly basis.

Additional information is contained within the enclosed O&M Report. You are requested to respond by thirty (30) days from the date of this memo.

A copy of your response is also to be sent to Jan Sealock, Waste Management Division, Department of Natural Resources, P.O. Box 30241, Lansing, MI 48909.

If you have any questions, please contact me at (313)-953-0241, (313)-953-1457, or Jan Sealock at (517)-373- 4630.

Sincerely,

Christopher L. Silva

Christopher L. Silva
Environmental Quality Analyst

CS/cs
Enclosure: O&M Report
Attachment
cc: B. Okwumabua
Jan Sealock
C&E File
U.S. EPA, Region V

ATTACHMENT

Quanex Corporation
MID 082 767 591
O&M Inspection for 12/20/90

1. The sampling and analysis plan (April 1986, Groundwater Quality Assessment Program) must be updated to include the following items:

   a) Detection limits for all required parameters. [Violation - 40 CFR 265.92(a)(3)]

   b) Laboratory QA/QC procedures (spikes, duplicates, standards). [Violation - 265.92(a)(3)]

   c) Specify purge method, fate of purged water, how purge volume is calculated. [Violation - 265.92(a)(1)]

   d) Specify correct analytical methods for dissolved oxygen, nitrate-nitrite, and organic carbon.

   e) Inspection of well casing, protective casing, surface pad, and lock during routine sampling events. Provisions to repair any damage must be included. [Area of concern]

2. The company must supply additional data supporting its claim that the arsenic detected in some wells is naturally occurring. The company must submit a proposal within ninety (90) days for additional well(s) and sampling. The proposal in the 1990 Annual Groundwater report is not adequate (see discussion in text of O&M writeup). The proposal must address the following: [Area of concern - 265.93(d)(4)(i)]

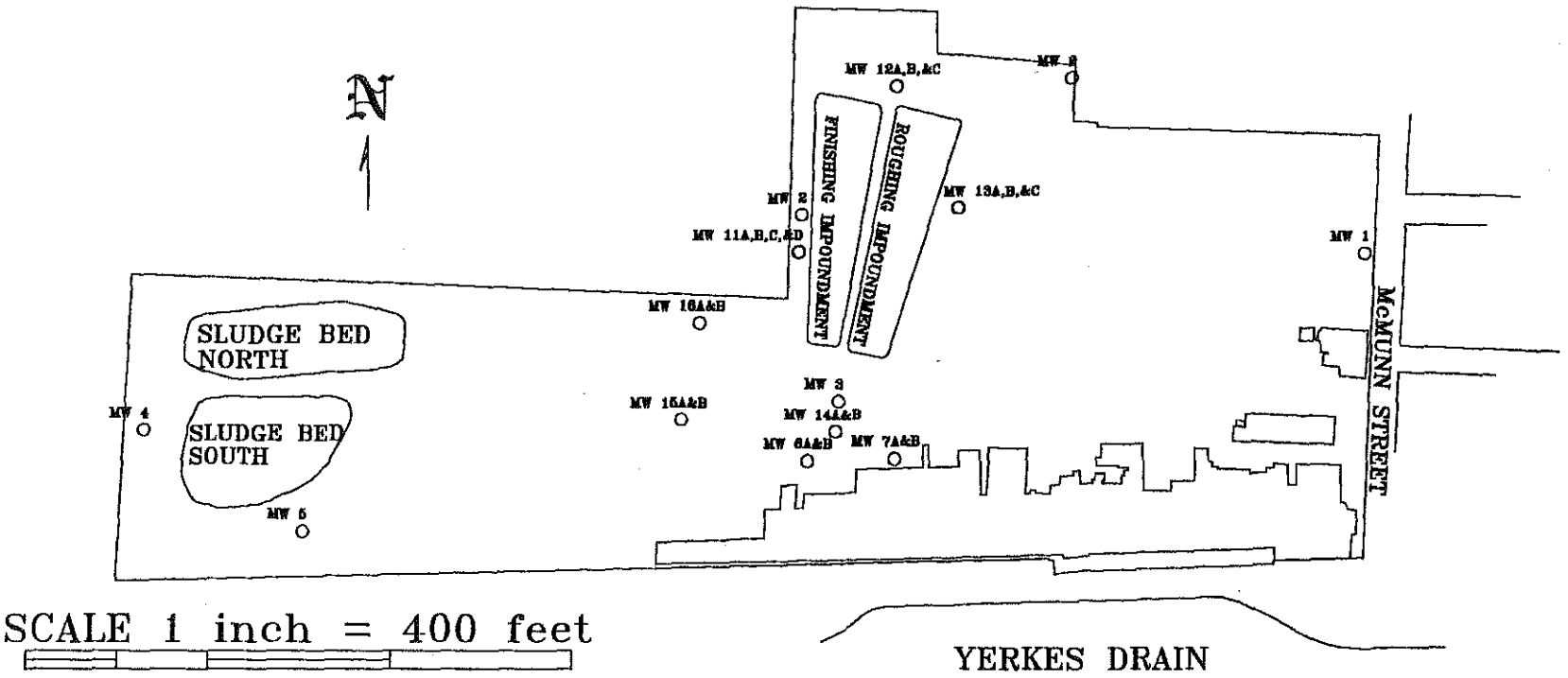
   a) Installation of a new deep well at MW-1.
   b) Sampling of deep wells 12C and 13C.
   c) Explanation of different top of casing elevations. d) Analysis of vertical gradients to geochemistry.

3. The 1,1 dichloroethane contamination must be addressed. The most obvious vehicle is to address this contaminant through the HSWA process. EPA has already started the RFA. The 1,1 dichloroethane found in low levels in wells 11A and 11B may be related to a SWMU found directly under the southern part of the RCRA impoundments. Another source may also be present at the site because well 6A has shown consistently higher levels, and this well is located farther away from the impoundments. The RFI to be eventually conducted under HSWA must include addressing the 1,1 dichloroethane. [Area of concern]

Operation and Maintenance Inspection

Conducted By
Waste Management Division
Michigan Department of Natural Resources

BASE MAP OF QUANEX MONITOR WELLS



STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

November 30, 1990

Mr. Donald Comfort
Quanex Corporation
400 McMunn
South Lyons, Michigan 48178

Dear Mr. Comfort:

SUBJECT: Quanex Corporation, MID 082 767 591

The Michigan Department of Natural Resources will be visiting Quanex Corporation on December 20, 1990, to conduct an Operation and Maintenance Inspection of your groundwater monitoring system(s).

In follow-up to the Comprehensive Monitoring Evaluation (CME) previously conducted at your facility, which evaluated site hydrogeology and the design adequacy of your groundwater monitoring system, the Operating and Maintenance Inspection or OMI will focus on the performance, operation and maintenance of this system pursuant to act 64 P.A. 1979, as amended, Part 10, Rule 299.11003(n) referencing Part 265, Subpart F of the Resource Conservation and Recovery Act (RCRA) or part of your current Act 64 operating license. The OMI will include the following compliance determinations:

1. A Sampling Inspection and Sampling and Analysis Plan review to verify physical integrity of individual wells and sampling equipment, proper collection of groundwater samples to ensure that sampling and handling procedures as outlined in the S/A plan and/or permit conditions are being followed. The sampling inspection shall include a split sampling of selected wells and collection of groundwater elevation data for establishing groundwater flow directions. This is planned for 12/20/90.

2. A review and evaluation of all data records including recent and previous hydrogeologic information for determination of the continued viability of your facility's groundwater monitoring system.

QUANEX CORPORATION

SOUTH LYONS, MICHIGAN

MID 082 767 591

OPERATION AND MAINTENANCE INSPECTION

Field Inspection Guide

Sampling and Analysis Inspection

Monitor Well Data Sheets

Groundwater Contour Map

Additional Reviews

1. Total versus Dissolved Metals Data Comparison
2. Stiff\Piper\Pie Diagrams
3. 1990 Annual Groundwater Report Review

Summary Letter and EPA Reporting Forms

Evaluated By:

Dave Slayton
Jan Sealock

February 27, 1991

Field Inspection Guide Checklist

APPENDIX B
Part Two

Field Inspection Guide

PART TWO

The field inspector will complete four tasks during the field inspection. They are: 1) review the operating record to identify evidence of deficiencies in the owner/operator's sampling and/or operation and maintenance programs; 2) visually inspect each well and piezometer for evidence of damage or deterioration; 3) obtain measurements from the operations record of depths of water levels and well depths for each well and piezometer; and 4) visually observe the owner/operator's field crew as they collect ground-water samples.

Name of inspector(s) Jan Semcock

Date(s) of inspection 12/20/90

1. Review the operating record of the facility. Does the operating record:	Y/N
Include annual reports of ground-water monitoring results including ground-water level data from each well and piezometer in the monitoring system?	Y
Include an inventory of all sampling devices and purging equipment in use at the facility and information on model number, serial number and manufacurers name?	Y- but with EPA's Record. Not in Plan
Include detailed operating, calibration and maintenance procedures for each sampling device?	Y
Describe decision criteria to be used to replace or repair sampling equipment and/or monitoring wells?	Y
Include schedules for performing operation and maintenance activities related to the ground-water monitoring system?	Y Quarterly when Sampling Well
Include records for ground-water monitoring which provide information on 1) the date, exact place and time of sampling or measurements; 2) the individual(s) who performed the sampling or measurements; 3) the date(s) analyses were performed; 4) the analytical techniques or methods used; and 5) the results of such analyses?	Y
Include records of all monitoring information including all calibration and maintenance records?	Y
Include records of monitoring information including determination of ground-water surface elevations?	Y
Include a determination of ground-water flow rate and direction(s) in the uppermost aquifier on an annual basis (e.g., prepare a potentiometric map annually using data collected during the year)?	Y
Provide for more frequent and intensive inspection of wells constructed of non-inert casing such as PVC? (Refer to Appendix A for permit example.)	N - Quarterly when Sampling Wells

2. Visually inspect each well and piezometer and complete the table below (one line entry for each well or piezometer):

Well/ Piezometer	Survey Mark Present?	Standing or Ponded Water?	Evidence of Collision Damage?	Evidence of Frost Heaving?	Evidence of Casing De-gradation?	Lock in Place?	Evidence of Well Sub-sidence?	Photograph Taken?
MW 11A	N	N	N	N	N	Y	N	N
MW 11B	N	N	N	N	N	Y	N	N
MW 11D	N	N	N	N	N	Y	N	N
MW 13A	N	N	N	N	N	Y	N	N
MW 13B	N	N	N	N	Y	Y	N	N
MW 1	N	N	N	N	N	Y	N	N

4. Observe the owner/operator's staff as they collect ground-water samples at several wells. Complete the following table for each well (Note: revise or add to the table if permit conditions dictate a different requirement the owner/operator must follow):

Position/Title	Name	Sampling Experience (years and type)
Field Services Supervisor	Bob Thomas	4 yrs. Exp. - Soil, Water, Wastewater Exp.
Field Services Technician	Jim Koester	2½ yr. Exp. - Soil, Water, Wastewater Exp.

Well Identification Number MW3 1A 2B 2D, 3A, 3B MW1	Y/N	Photograph Taken Y/N
Did the sampling crew measure static water levels in the well and well depths prior to the sampling event?	Yes	No
Did the sampling crew use a steel tape or electronic device to take depth measurements?	Yes	No
Did the sampling crew record depths to +/– 0.01 feet?	Yes	No
Did the sampling crew follow these procedures: 1. remove locking and protective cap; 2. sample the air in the well head for organic vapors; – No 3. determine the static water level; and 4. lower an interface probe into the well to detect immiscible layers. – No	Yes	No
If immiscible samples were collected, were they collected prior to well purging?	NA	No
Did the sampling crew evacuate low yielding wells to dryness prior to sampling?	Yes	No
Did sampling crew evacuate high yielding wells so that at least three casing volumes were removed?	Yes	No
Did the sampling crew collect the purge water for storage and analysis or for shipment off-site to a RCRA treatment facility?	No	No
Were sampling devices constructed of fluorocarbon resins or stainless steel? – Teflon Bailer	Yes	No

(Continued)

Well Identification Number MW3-11A, 11B, 11D, 13A, 13B, MW1	Y/N	Photograph Taken Y/N
Were samples taken from the bladder pump discharge tube, and not from any purge device discharge tube?	NA	N
Was the bladder pump discharge flow checked for the presence of gas bubbles before each sample collection, as a test for bladder integrity?	NA	N
Was bladder pump flow performance monitored regularly for dropoff in flow rate and discharge volume per cycle?	NA	N
Was the bladder pump incorporated in a combination sample-purge pump design which can expose the bladder pump interior and discharge tubing to the pump drive gs? If so, were operating procedures established and followed to prevent at all times the entry of drive gas into the sample flow or into the bladder pump interior?	NA	N
Did the sampling crew collect and containerize samples in the order of the volatilization sensitivity of the parameters?	Yes	N
Did the sampling crew measure the following parameters in the field: pH, temperature, specific conductane?	Yes	N
Did the sampling crew sample background wells before sampling downgradient wells?	No	N
Did the sampling crew use fluorocarbon resin or polyethylene containers with polypropylene caps for samples requiring metals analysis?	Yes	N
Did the sampling crew use glass bottles with fluorocarbon resin-lined caps for samples requiring metals analysis?	No	N
If metals were the analytes of concern, did the sampling crew use containers cleaned with nonphosphate detergent and water, and rinsed with nitric acid, tap water, hydrochloric acid, tap water and finally Type II water?	NA	N
If organics were the analytes of concern, did the sampling crew use containers cleaned with nonphosphate detergent, rinsed with tap water, distilled water, acetone, and finally pesticide quaility hexane?	NA	N
Did the sampling crew filter samples requiring analysis for organics?	No	N

After working through Part Two, the field inspector will have:

- assessed whether the owner/operator's sampling crew departed from written sampling and analysis procedures as contained in the owner/operator's sampling and analysis plan (interim status) or in the owner/operator's RCRA permit (permit status);

- identified deficiencies in the way the owner/operator's sampling crew collected ground-water samples;

- identified deficiencies in the owner/operator's program to ensure on-going maintenance of sampling devices and monitoring wells/piezometers;

- identified deficiencies in the owner/operator's operating record (Does theoperating record have all the information in it that is required?); and

- collected field data that will allow the enforcement official to construct potentiometric maps and assess the viability of individual wells.

Sampling and Analysis Inspection

Sampling and Analysis Inspection
Quanex Corporation
MID 082 767 591

On December 20th, 1990, a sampling inspection was conducted at the Quanex Corporation as part of an Operational and Maintenance Inspection (O&M). The latest Sampling and Analysis Plan (SAP), is dated April, 1986. This plan is kept on-site. It has been determined that this plan must be updated with the deficiencies outlined in this report.

Consultants Jim Wooster and Bob Thomas from WW Engineering and Science (WWES) of Livonia were involved in the split sampling. Static water level measurements were conducted using an electric meter by both the MDNR and WWES. All measurements were taken to the nearest .01th of a foot to be used in the making of groundwater contour maps. Static water level measurements and purging were conducted on December 20th by WWES, the samples were collected directly after purging. For decontamination purposes, WWES rinsed the electric meter with an ample amount of deionized water between wells. All wells were in good condition. There was, however, some casing degradation found at well 13B. This should be inspected periodically for further deterioration. The revised SAP should incorporate the inspection of the monitoring system during each sampling event so that problems can be identified and rectified.

A teflon bailer was utilized to purge the wells. Purge volumes on the 20th were based on three times the casing water volume, or until the well ran dry. The evacuated water was discharged to a graduated 5 gallon bucket for accurate volume determination. This volume was disposed away from the well, preventing infiltration into the casing and the immediate groundwater sampling point. WWES followed good safety protocol by wearing gloves while collecting samples from the wells.

The teflon bailer was also used to collect the water samples that day. All bailers were cleaned and decontaminated before sampling began. There was one bailer for each well so no decontamination was done at the site. New nylon rope was tied to each bailer before sampling. Those samples collected for volatiles were poured slowly from the bailer to reduce aeration of the sample. Samples were stored in appropriate bottles for analysis. The samples were immediately transferred to coolers filled with ice.

Both field parameters of pH and specific conductivity were

taken by WWES and the MDNR. Both meters were calibrated before use, also the pH meter was checked before each well with a buffer. An equipment blank and a field blank were both taken as part of field QA\QC protocol.

The most recent Sampling and Analysis Plan (SAP) is a Groundwater Quality Assessment Program received by the MDNR was an April, 1986 document submitted by EDI Engineering and Science. A number of areas are incorporated in the plan, however, some areas were deficient. All deficiencies listed below were deficiencies listed in the Comprehensive Monitoring Evaluation (CME) done in 1988. These deficiencies will be listed as violations. No information was provided in the plan on detection limits, laboratory QA\QC such as spikes, standards, or duplicates. No information was provided on the purge method utilized, fate of purge water and purge water volume determination calculations. The method references for some parameters appear to be in error. The Standard Methods reference should be 421, not 412 for dissolved oxygen. Nitrate-nitrite should be method 353 for reference 3, not 201. Reference 3 method 415 should be cited for organic carbon, not 236. These changes must be added to the Groundwater Quality Assessment Program. This concludes the sampling and analysis portion of the O&M inspection.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
WASTE MANAGEMENT DIVISION
Water Sampling Data Sheet

FACILITY: Quanex LOCATION: South Lyons
CONTACT: Bob Comfort PHONE: (313) 486-0100

		Sample #	11A	11B	11D	13A	13S	Mw 1	FB
		Date	12/20/90	12/20/90	12/20/90	12/20/90	12/20/90	12/20/90	12/20/9
		Time	10:30	11:00	11:35	12:05	12:20	12:45	1:17
		pH (field)							
		Conductivity (field)	1600	1710	1,010	1715	1560	1310	
		Temperature (°c) (field)							
		TDS (field)							
PO	1		✓	✓	✓	✓	✓	✓	✓
PO	2		✓	✓	✓	✓	✓	✓	✓
ON	3								
OB	GC/MS B/N								
OA	8								
OG	oil & grease		MA/ MAD	MB MAD				MA MAD	
MA/D	Basic 6/Fe		✓ ✓	✓ ✓	✓	✓	✓	✓ ✓	✓
	Ca/Mg/Na/K								
	Hg/As/Se/Sb								
MN	Cl/SO_4/Alk		✓	✓	✓	✓	✓	✓	✓
	HCO_3/CO_3								
	Fluoride/Cr^+6								
GA	COD/TOC								
	NO_3NO_2/NH_3								
	Kjel N/TotP								
GG	Phenols								
GB	Total/Free Cn								
	Sample Appearance		Light Brown Silty Liquid		Clear	Silty Brown	Clear	Clear	Clear

Additional Notes:

* All Samples Filtered at least twice.

Basic 6 = Cd, Cr, Cu, Ni, Pb, Zn

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY

REPORT Waste Management Division
TO Ottawa Building
Lansing, MI 48909

ATTEN JAN SEALOCK

LABORATORY WORK ORDER # 90-12-073
WORK ID QUANEX - SOUTH LYON
P.O. # 60026 COST $ 1523.50
RECEIVED 12/20/90 CLIENT WM
REPORTED _____ NUMBER OF SAMPLES 7
LAB CONTACT OR IN MATRIX WATER

TEST UNITS	MW-11A	MW-11B	MW-11D	MW-13A
Alkalinity of Water mg CaCO3/l	156	170	284	517
Carbonate Alkalinity mg CaCO3/l	K 5	K 5	K 5	K 5
Bicarbonate Alkalinity mg CaCO3/l	156	170	284	517
Arsenic by Furnace ug/l	20	7.8		
Barium in Water ug/l	86	52		
Calcium in Water mg/l	325	373		
Cadmium in Water ug/l	K 20	K 20		
Chloride in Water mg/l	99	121	64	51
Chromium in Water ug/l	K 50	K 50		
Copper in Water ug/l	K 20	K 20		
Arsenic by Furnace - Diss. ug/l (Diss)	5.2	3.9	5.5	3.0
Barium - Dissolved ug/l (Diss)	59	20	126	306
Calcium - Dissolved mg/l (Diss)	313	339	142	342
Cadmium - Dissolved ug/l (Diss)	K 20	K 20	K 20	K 20
Chromium - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Copper - Dissolved ug/l (Diss)	K 20	K 20	K 20	K 20
Iron - Dissolved ug/l (Diss)	5300	4600	3000	10000
Potassium - Dissolved mg/l (Diss)	11	6.7	2.45	6.1
Magnesium - Dissolved mg/l (Diss)	32.9	40.2	36	52

TEST UNITS	MW-13B	MW-1	FIELD BLANK
Cadmium in Water ug/l		K 20	
Chloride in Water mg/l	142	81	K 1
Chromium in Water ug/l		K 50	
Copper in Water ug/l		K 20	
Arsenic by Furnace - Diss. ug/l (Diss)	4.8	K 1.0	K 1.0
Barium - Dissolved ug/l (Diss)	27	27	K 10
Calcium - Dissolved mg/l (Diss)	312	272	K 1
Cadmium - Dissolved ug/l (Diss)	K 20	K 20	K 20
Chromium - Dissolved ug/l (Diss)	K 50	K 50	K 50
Copper - Dissolved ug/l (Diss)	K 20	K 20	K 20
Iron - Dissolved ug/l (Diss)	6850	4800	K 100
Potassium - Dissolved mg/l (Diss)	4.8	5.6	K .1
Magnesium - Dissolved mg/l (Diss)	45	19	K 1
Manganese - Dissolved ug/l (Diss)	250	535	K 20
Sodium - Dissolved mg/l (Diss)	92.7	57.5	K 1
Nickel - Dissolved ug/l (Diss)	K 50	K 50	K 50
Lead - Dissolved ug/l (Diss)	K 50	K 50	K 50
Zinc - Dissolved ug/l (Diss)	K 50	1100	K 50
Iron in Water ug/l		11700	
Potassium in Water mg/l		5.9	
Magnesium in Water mg/l		20.8	
Manganese in Water ug/l		595	
Sodium in Water mg/l		59.8	

SAMPLE ID MW-11A FRACTION 01A TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 12/20/90 Category

ANALYST WILFORD
ANALYZED 12/27/90
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	#Bromomethane	ND		5.0
75-00-3	#Chloroethane	ND		5.0
75-69-4	#Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	1,1-Dichloroethane	3.2	UC	1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
75-25-2	Bromoform	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
# Compound identity not confirmed by second independent technique.

Received: 12/20/90 Results by Sample

SAMPLE ID MW-11B FRACTION 02A TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 12/20/90 Category

ANALYST WILFORD
ANALYZED 12/27/90
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	1,1-Dichloroethane	3.2	UC	1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
75-25-2	Bromoform	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

Received: 12/20/90 Results by Sample

SAMPLE ID MW-11D FRACTION 03A TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 12/20/90 Category

ANALYST WILFORD
ANALYZED 12/27/90
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
75-25-2	Bromoform	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID MW-13A FRACTION 04A TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 12/20/90 Category

ANALYST WILFORD
ANALYZED 12/27/90
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
75-25-2	Bromoform	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID MW-13B FRACTION 05A TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 12/20/90 Category

ANALYST WILFORD
ANALYZED 12/28/90
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	‡Bromomethane	ND		5.0
75-00-3	‡Chloroethane	ND		5.0
75-69-4	‡Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
75-25-2	Bromoform	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
‡ Compound identity not confirmed by second independent technique.

SAMPLE ID MW-1 FRACTION 06A TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 12/20/90 Category

ANALYST WILFORD
ANALYZED 12/28/90
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	‡Bromomethane	ND		5.0
75-00-3	‡Chloroethane	ND		5.0
75-69-4	‡Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
75-25-2	Bromoform	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
‡ Compound identity not confirmed by second independent technique.

Received: 12/20/90 Results by Sample

SAMPLE ID FIELD BLANK FRACTION 07A TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 12/20/90 Category

ANALYST WILFORD
ANALYZED 12/28/90
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	‡Bromomethane	ND		5.0
75-00-3	‡Chloroethane	ND		5.0
75-69-4	‡Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	Chloroform	ND		1.0
71-55-6	1,1,1-Trichloroethane	ND		1.0
56-23-5	Carbon tetrachloride	ND		1.0
107-06-2	1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	1,2-Dichloropropane	ND		1.0
75-27-4	Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		1.0
75-25-2	Bromoform	ND		1.0
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
‡ Compound identity not confirmed by second independent technique.

Quanex Corp. South Lyon, MI MID 082 767 591

Sampled 12/20/90

Parameter in ppm / mg/L Inorganics	MW-IIA	MW-IIB	MW-11D	MW-13A	MW-13B	MW-I	Field Blank
Alkalinity	156	170	284	5.17	216	169	<10
Carbonate	<5	<5	<5	<5	<5	<5	<5
Bicarbonate	156	170	284	5.17	216	169	<10
Arsenic	.020	.0078				.0056	
Diss Arsenic	.0052	.0039	.0055	.0030	.0048	<.0010	<.0010
Barium	.086	.052				.052	
Calcium	325	373				277	
Diss Calcium	313	339	142	342	312	272	<1.0
Cadmium	<.020	<.020				<.020	
Diss Cadmium	<.020	<.020	<.020	<.020	<.020	<.020	<.020
Chloride	99	121	64	51	142	81	<1.0
Chromium	<.050	<.050				<.050	
Diss. Chromium	<.050	<.050	<.050	<.050	<.050	<.050	<.050
Copper	<.020	<.020				<.020	
Diss. Copper	<.020	<.020	<.020	<.020	<.020	<.020	<.020
Diss. Barium	.059	.020	.126	.306	.027	.027	<.010
Iron	12.9	12.3				11.7	
Diss. Iron	5.3	4.6	3.0	10.0	6.85	4.8	<.100
Potassium	11.2	7.2				5.9	
Diss. Potassium	11.0	6.7	2.45	6.1	4.8	5.6	<.10
Magnesium	35	48				20.8	
Diss. Magnesium	32.9	40.2	36	52	45	19	<1.0
Manganese	.680	.545				.595	
Diss Manganese	.680	.390	.050	.765	.250	.535	<.020
Sodium	77	70.6				59.8	
Diss. Sodium	75.4	69.1	18	49.6	92.7	57.5	<1.0
Nickel	<.050	<.050				<.050	
Diss. Nickel	<.050	<.050	<.050	<.050	<.050	<.050	<.050
Lead	<.050	<.050				<.050	
Diss. Lead	<.050	<.050	<.050	<.050	<.050	<.050	<.050
Sulfate	832	873	177	624	759	629	<2
Zinc	<.050	<.050				23.0	
Diss Zinc	.078	.061	<.050	1.50	<.050	1.1	<.050
ORGANICS ug/L PPB							
1,1-Dichloroethane for Scan 1 & 2 Parameters*	3.2 UC* <detection	3.2 UC* <detection	<1.0 <detection	<1.0 <detection	<1.0 <detection	<1.0 <detection	<1.0 <detection

* UC = No attempt has been made to confirm the identity of the reported compound by a second independent technique due to problems.

* A list of Scan 1 & Scan 2 detection limits is provided with this report.

SCAN 1 - PURGEABLE HALOCARBONS

COMPOUND	DETECTION LIMIT (ug/l)
Vinyl chloride	5.0
Bromomethane*	5.0
Chloroethane*	5.0
Trichlorofluoromethane*	5.0
1,1-Dichloroethene	1.0
Methylene chloride*	5.0
trans-1,2-Dichloroethene	1.0
1,1-Dichloroethane	1.0
cis-1,2-Dichloroethene	1.0
Chloroform*	1.0
1,1,1-Trichloroethane*	1.0
Carbon tetrachloride*	1.0
1,2-Dichloroethane*	1.0
Trichloroethene	1.0
1,2-Dichloropropane*	1.0
Bromodichloromethane*	1.0
cis-1,3-Dichloropropene	1.0
trans-1,3-Dichloropropene	1.0
1,1,2-Trichloroethane*	1.0
Tetrachloroethene	1.0
Dibromochloromethane*	1.0
Chlorobenzene	5.0
Bromoform*	1.0
1,1,2,2-Tetrachloroethane*	1.0

* Compound not confirmed by second independent technique.

SCAN 2 - PURGEABLE AROMATIC HYDROCARBONS

COMPOUND	DETECTION LIMIT (ug/l)
Benzene	1.0
Toluene	1.0
Ethylbenzene	1.0
Xylene isomers	1.0

EL 070
5/90
MATRIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

SAFETY WARNING
YES / (NO) - INFO ON BACK

LAB ORDER# 9012073 | PROJ CODE _____ | PRIORITY II | RECEIVED AT LAB BY M | DATE 12/20/90 | TIME 1530 (AM / PM)

SUBMITTER DIVISION WMD | DISTRICT OR OFFICE Central Lansing | CONTACT PERSON FOR QUESTIONS Jan Seglock | PHONE (517) - 373-4740

LOCATION SAMPLED Quanex, South Lyon | COLLECTED BY Seglock/Skyton | TRANS TO _____

COST CENTER 60026 | SEND RESULTS TO ATTENTION OF Jan Seglock | AT ADDRESS (if different than above office) S. Ottawa Bldg WMD 10th Lansing

SAMPLE REMARKS groundwater

SAMPLE NUMBER	FIELD ID OR DESCRIPTION (25 Characters)	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MW-11A.	901220	10:30	gw - monitor well
02	MW-11B	901220	11:00	"
03	MW-11D	901220	11:35	"
04	MW-13A	901220	12:05	"
05	MW-13B	901220	12:30	"

GENERAL CHEMISTRY (=J=)

DO Diss Oxygen ... 1 2 3 4 5
(-K-)
GN NO2, o-Phos ... 1 2 3 4 5
Residue SS 1 2 3 4 5
Residue TDS ... 1 2 3 4 5
..... 1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
..... 1 2 3 4 5
(-Q-)
CA Chlorophyll ... 1 2 3 4 5
(-L-)
GA COD 1 2 3 4 5
TOC 1 2 3 4 5
NO3+NO2, NH3 .. 1 2 3 4 5
KJEL N, Tot P . 1 2 3 4 5
..... 1 2 3 4 5
(-M-)
GG Phenolics 1 2 3 4 5
(-N-)
GB Total CN 1 2 3 4 5
Free CN 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5

ORGANICS (=R=)

PO1 #1 Halocarbons 1 2 3 4 5 J
PO2 #2 Aromatic HC 1 2 3 4 5
..... 1 2 3 4 5
(-S-)
ON #3 Chloro HC + Pest & PCB , 1 2 3 4 5
..... 1 2 3 4 5
(-T-)
OB GC/MS Base Neut 1 2 3 4 5
..... 1 2 3 4 5
(-U-)
OA #8 Phenols 1 2 3 4 5
..... 1 2 3 4 5
(-V-)
OG Oil & Grease .. 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5

INORGANIC (=X=)

MA Total Metals 1 2 3 4 5
MAD Diss-Field Filtered .. 1 2 3 4 5
MD Diss-Lab Filtered 1 2 3 4 5

Ca Mg Na K , ... 1 2 3 4 5
Cd Cr Cu Ni Pb Zn ... 1 2 3 4 5
Fe Co Li Mn 1 2 3 4 5
Al Ba Be Mo Ti V 1 2 3 4 5
..... 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
..... 1 2 3 4 5
LOW LEVEL Ag 1 2 3 4 5
* As 1 2 3 4 5
* * Cd 1 2 3 4 5
* * Cr Cu Ni Pb .. 1 2 3 4 5
* * Zn Fe 1 2 3 4 5
(-Y-)
MN pH, Conductance 1 2 3 4 5
Cl, SO4, Total Alk 1 2 3 4 5
HCO3- CO3= , ... 1 2 3 4 5
CR+6 ..... 1 2 3 4 5
Fluoride 1 2 3 4 5
..... 1 2 3 4 5

* If samples are already past holding time or close to holding time when submitted, than initial to indicate that you will accept "ht" coded results.

EL 070
5/90
MATRIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

SAFETY WARNING
YES (NO) - INFO ON BACK

LAB ORDER# 9012073 PROJ CODE _____ PRIORITY II RECEIVED AT LAB BY MM DATE TIME 12/20/90 1530 (AM) PM

SUBMITTER DIVISION WMD DISTRICT OR OFFICE Central Lansing CONTACT PERSON FOR QUESTIONS Jan Sealock PHONE (517) - 373-4740

LOCATION SAMPLED Quarry, South Lyon COLLECTED BY Sealock/Slayton TRANS TO _____

COST CENTER 60026 SEND RESULTS TO ATTENTION OF Jan Sealock AT ADDRESS (if different than above office) S. Ottawa Bldg WMD/ONR Lansing

SAMPLE REMARKS groundwater

SAMPLE NUMBER	FIELD ID OR DESCRIPTION (25 Characters)	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
06	MW-1	90 12 20	12:48	gw - monitor well
07	FB	90 12 20	1:17	Field blank
03				
04				
05				

GENERAL CHEMISTRY

DO Diss Oxygen ... 1 2 3 4 5 | -J-
-K-
GN NO2, o-Phos ... 1 2 3 4 5
Residue SS 1 2 3 4 5
Residue TDS ... 1 2 3 4 5
..... 1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
..... 1 2 3 4 5 | -Q-
CA Chlorophyll ... 1 2 3 4 5 | -L-
GA COD 1 2 3 4 5
TOC 1 2 3 4 5
NO3+NO2, NH3 .. 1 2 3 4 5
KJEL N, Tot P . 1 2 3 4 5
..... 1 2 3 4 5 | -M-
GG Phenolics ..... 1 2 3 4 5 | -N-
GB Total CN 1 2 3 4 5
Free CN 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5

ORGANICS

PO1 #1 Halocarbons (1) 2 3 4 5 | -R-
PO2 #2 Aromatic HC (1) 2 3 4 5
..... 1 2 3 4 5 | -S-
ON #3 Chloro HC + Pest & PCB . 1 2 3 4 5
..... 1 2 3 4 5 | -T-
OB GC/MS Base Neut 1 2 3 4 5
..... 1 2 3 4 5 | -U-
OA #8 Phenols 1 2 3 4 5
..... 1 2 3 4 5 | -V-
OG Oil & Grease .. 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5

INORGANIC

MA Total Metals ..... (1) 2 3 4 5 | -X-
MAD Diss-Field Filtered .. (1) 2 3 4 5
MD Diss-Lab Filtered ..... 1 2 3 4 5 | -Y-
Ca Mg Na K ..... (1) 2 3 4 5
Cd Cr Cu Ni Pb Zn .... (1) 2 3 4 5
Fe Co Li Mn ..... (1) 2 3 4 5
Al Ba Be Mo Ti V ..... (1) 2 3 4 5
..... 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
..... 1 2 3 4 5
LOW LEVEL Ag 1 2 3 4 5
* As ..... (1) 2 3 4 5
* * Cd 1 2 3 4 5
* * Cr Cu Ni Pb .. 1 2 3 4 5
* * Zn Fe ..... 1 2 3 4 5 | -Y-
MN pH, Conductance 1 2 3 4 5
Cl, SO4, Total Alk 1 2 3 4 5
HCO3- CO3= 1 2 3 4 5
CR+6 ..... 1 2 3 4 5
Fluoride 1 2 3 4 5
..... 1 2 3 4 5

* If samples are already past holding time or close to holding time when submitted, than initial to indicate that you will accept "ht" coded results.

Monitor Well Data Sheets

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WASTE MANAGEMENT DIVISION

O & M MONITOR WELL & GROUND WATER DATA SHEET

Facility: Quanex Location: South Lyons

Type of Facility: Land Disposal

Contact: Dan Comfort Phone: (313) 486-0100

WELL INFORMATION

Name/Number: MW 11A
Depth: 27.25'
Diameter: 2"
Casing Ht. Above Ground: ___
Top of Casing Elev.: ___
Protective Barrier: ___
Concrete Pad: Yes ✓ No ___
Elevation of Screened Interval: ___ to ___
Location of TOC Survey Mark: ___

Cap Locked: Yes ✓ No ___
Casing Material: PVC
Screen Slot Size: ___
Screen Length: ___
Screen Material: ___
Screen Packed: Yes ? No ___
Well Condition: Good

SAMPLING INFORMATION

	DNR	FACILITY
Initial Static Water Level:	14.58'	14.56'
Method:	Electric meter	Electric meter
Measured By:	Dan S.	Bob Thomas
Stabilized pH:		6.92
Stabilized Conductance:	1166	1884
Temperature:		9.3C

Purge Method: Teflon Bailer Vol. Purged: 6.25 gallons to purge
Fate of Purge Water: Strewn Bucket Away from well
Recovery Rate: Good Appearance: Light Brown Color
Sampling Method: Teflon Bailer Appearance: Light Brown
Staff Present: Jim Scalcell, Dave Snyder Date: 12/20/90

Standing Water: Y/(N) Frost Heaving: Y/(N)
Collision Damage: Y/(N) Well Subsidence: Y/(N)
Casing Degredation: Y/(N) Photograph Taken: Y/(N)

Additional Notes: Jim Wooster Bob Thomas Nylon Rope Teflon Bailer used to sample wells. pH & Conductivity taken. Calibrations done before sampling. Also buffer readings before well. Equipment blank and field blank taken. Bailers are precleaned before sampling and rinsed before use.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WASTE MANAGEMENT DIVISION

O & M MONITOR WELL & GROUND WATER DATA SHEET

Facility: Quanex Location: South Lyons MI

Type of Facility: Land Disposal

Contact: Don Comfort Phone: (313) 486-0100

WELL INFORMATION

Name/Number: 11B
Depth: 36.5
Diameter: 2"
Casing Ht. Above Ground: 2.5'
Top of Casing Elev.: ____
Protective Barrier: ____
Concrete Pad: Yes ✓ No ___
Elevation of Screened Interval: ____ to ____
Location of TOC Survey Mark: ____

Cap Locked: Yes ✓ No ___
Casing Material: pvc
Screen Slot Size: ____
Screen Length: ____
Screen Material: ____
Screen Packed: Yes ___ No ___
Well Condition: good

SAMPLING INFORMATION

	DNR	FACILITY
Initial Static Water Level:	15.01'	15.00'
Method:	[illegible]	Electric Meter
Measured By:	[illegible]	Bob Thomas
Stabilized pH:		6.97
Stabilized Conductance:	1710	1987
Temperature:		10.9°C

Purge Method: Teflon bailer Vol. Purged: 10.5
Fate of Purge Water: [illegible]
Recovery Rate: Good Appearance: Silty Brown
Sampling Method: Teflon bailer Appearance: Silty Brown
Staff Present: Jim Sedlock, [illegible] Date: 12/20/90

Standing Water: Y/N (N)
Collision Damage: Y/N (N)
Casing Degredation: Y/N (N)
Frost Heaving: Y/N (N)
Well Subsidence: Y/N (N)
Photograph Taken: Y/N (N)

Additional Notes: Bob - 4 yrs Exp - Field Services Supervisor
Jim - 2½ yrs Exp. - Field Services Tech - Silt/Water
Filtering in the field. Different Nylon Rope used on the wells

Silt/Water, gate water, Silt/Water, waste water

S.T.T.C on 1/C 16.12 (9")

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WASTE MANAGEMENT DIVISION

O & M MONITOR WELL & GROUND WATER DATA SHEET

Facility: Cranes Location: South Lyons MI

Type of Facility: Land Disposal

Contact: Don Comfort Phone: (313) 486-0100

WELL INFORMATION

Name/Number: MW 11D
Depth: 72.8
Diameter: 2"
Casing Ht. Above Ground:
Top of Casing Elev.:
Protective Barrier:
Concrete Pad: Yes ✓ No
Elevation of Screened Interval: to
Location of TOC Survey Mark:

Cap Locked: Yes ✓ No
Casing Material: PVC
Screen Slot Size:
Screen Length:
Screen Material:
Screen Packed: Yes No
Well Condition: Good

SAMPLING INFORMATION

	DNR	FACILITY
Initial Static Water Level:	14.87'	14.88'
Method:	Electric Meter	Electric Meter
Measured By:	Dave Slayton	~~Dave~~ Bob Thomas
Stabilized pH:		6.73
Stabilized Conductance:	4C10	1030
Temperature:		11.6

Purge Method: Teflon Bailer Vol. Purged: 28.5 gals
Fate of Purge Water: 5 gallons Bucket away monitor
Recovery Rate: Good Appearance: Silty somewhat clear
Sampling Method: Teflon Bailer Appearance: Same
Staff Present: Jon Seyler, Dave Slayton Date: 12/20/90

Standing Water: Y/N
Collision Damage: Y/N
Casing Degredation: Y/N
Frost Heaving: Y/N
Well Subsidence: Y/N
Photograph Taken: Y/N

Additional Notes: Sampling for Metals, Organics & General Chemistry Parameters.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WASTE MANAGEMENT DIVISION

O & M MONITOR WELL & GROUND WATER DATA SHEET

Facility: Rimmer Location: South Lyons, MI.

Type of Facility: Land Disposal

Contact: Don Comfort Phone: (313) 486-0100

WELL INFORMATION

Name/Number: 13A
Depth: ~~20~~ 21.7'
Diameter: 2"
Casing Ht. Above Ground: ___
Top of Casing Elev.: _____
Protective Barrier: _____
Concrete Pad: Yes ___ No ✓
Elevation of Screened Interval: _____ to _____
Location of TOC Survey Mark: _____

Cap Locked: Yes ✓ No ___
Casing Material: PVC
Screen Slot Size: _____
Screen Length: _____
Screen Material: _____
Screen Packed: Yes ? No ___
Well Condition: Good

Not Visible

SAMPLING INFORMATION

	DNR	FACILITY
Initial Static Water Level:	10.30'	10.34'
Method:	Electric Meter	Electric Meter
Measured By:	Jan Seelock	Bob Thomas
Stabilized pH:	~~6.65~~	6.65
Stabilized Conductance:	1.75 ~~1960~~	1969
Temperature:	~~11.4°C~~	16.4

Purge Method: Teflon Bailer Vol. Purged: 5.5 Gal.
Fate of Purge Water: 5 Gallon Bucket then Drum
Recovery Rate: Good Appearance: Silty Brown
Sampling Method: Teflon Bailer Appearance: Silty Brown
Staff Present: Jan Seelock, Dave Slayton Date: 12/20/90

Standing Water: Y (N) Frost Heaving: Y (N)
Collision Damage: Y (N) Well Subsidence: Y (N)
Casing Degredation: Y (N) Photograph Taken: Y (N)

Additional Notes: _____

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WASTE MANAGEMENT DIVISION

O & M MONITOR WELL & GROUND WATER DATA SHEET

Facility: Granger Location: South Lyon, MI

Type of Facility: Land Disposal

Contact: Don Comfort Phone: (313) 486-0100

WELL INFORMATION

Name/Number: 13 B
Depth: 52'
Diameter: 2"
Casing Ht. Above Ground: ___
Top of Casing Elev.: ___
Protective Barrier: ~~✓~~
Concrete Pad: Yes ✓ No ~~✓~~
Elevation of Screened Interval: ___ to ___
Location of TOC Survey Mark: ___

Cap Locked: Yes ✓ No ___
Casing Material: PVC
Screen Slot Size: ___
Screen Length: ___
Screen Material: ___
Screen Packed: Yes ___ No ___
Well Condition: Good

SAMPLING INFORMATION

13C
12.65'

	DNR	FACILITY
Initial Static Water Level:	13.84'	13.34'
Method:	Electric meter	Electric meter
Measured By:	Jim Sealock	Bob Thomas
Stabilized pH:	6.88 →	
Stabilized Conductance: 1560	1999 →	
Temperature:	10.9°C →	

Purge Method: Teflon Bailer Vol. Purged: 17.25 gal.
Fate of Purge Water: Contained Bucket away from well
Recovery Rate: Good Appearance: Clear
Sampling Method: Teflon Bailer Appearance: Clear
Staff Present: Jim Sealock, Dave Slaton Date: 12/20/90

Standing Water: Y/N
Collision Damage: Y/N
Casing Degredation: Y/N Somewhat at Top
Frost Heaving: Y/N
Well Subsidence: Y/N
Photograph Taken: Y/N

Additional Notes: ___

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WASTE MANAGEMENT DIVISION

O & M MONITOR WELL & GROUND WATER DATA SHEET

Facility: Quanex Location: South Lyons, MI

Type of Facility: LAND DISPOSAL

Contact: Don Comfort Phone: (313) 486-0100

Bob Thomas
Jim Wooster

WELL INFORMATION

Name/Number: MW 1
Depth: 19.40
Diameter: 2"
Casing Ht. Above Ground: ___
Top of Casing Elev.: ___
Protective Barrier: ___
Concrete Pad: Yes ✓ No ___
Elevation of Screened Interval: ___ to ___
Location of TOC Survey Mark: ___

Cap Locked: Yes ✓ No ___
Casing Material: Galvan. Teed Steel
Screen Slot Size: ___
Screen Length: ___
Screen Material: ___
Screen Packed: Yes ___ No ___
Well Condition: Good - New Casing Pitting

SAMPLING INFORMATION

	DNR	FACILITY
Initial Static Water Level:	12.04'	11.98'
Method:	Electric Meter	Electric meter
Measured By:	Dave Slayton	Bob Thomas
Stabilized pH:		6.98
Stabilized Conductance:	1310	1575
Temperature:		10.1

Purge Method: Teflon Bailer Vol. Purged: 4 gallons
Fate of Purge Water: Some Poured away from well
Recovery Rate: Good Appearance: Silty Brown
Sampling Method: Teflon Bailer Appearance: clear
Staff Present: Jon Seabolt, Dave Slayton Date: 12/20/90

Standing Water: Y/(N)
Collision Damage: Y/(N)
Casing Degredation: Y/(N)
Frost Heaving: Y/(N)
Well Subsidence: Y/(N)
Photograph Taken: Y/(N)

Additional Notes: ___

Groundwater Contour Map

QUANEX O&M INSPECTION
2/27/91
GROUNDWATER FLOW

Groundwater flow direction has remained virtually unchanged at this site since records have been kept (about 1984). The attached groundwater contour map is based on data from shallow monitoring wells. The data was obtained by the consultant for Quanex on 12/20/90. Shallow groundwater flow in the vicinity of the RCRA impoundments is toward the southwest, with a turn toward the west in the vicinity of wells MW-15 and MW-16. The map was done with a contouring program on a personal computer. The contour map was compared with a hand drawn map to confirm.

In addition, there are multiple well clusters available at this site. Groundwater flow in the mid-level monitoring wells (11B, 12B, 13B, 15B, 16B) based on a hand contour map was also found to be toward the west-southwest. For the deepest wells (12C, 13C, 11D), the groundwater flow direction is nearly due west for the December 1990 Quanex data. Attached is a groundwater contour map for the mid-level wells (B wells) from the 1990 Annual Groundwater Report (WWES).

The relative groundwater elevations found in all the wells during the December 1990 sampling are very similar to historic measurements. In fact, groundwater contour maps contained in the Groundwater Quality Assessment Program done be EDI Engineering & Science in April 1986 in figures 16, 17, and 18 are almost identical to the groundwater flow found in recent samplings. The exception is that there is less mounding now around the impoundments because they are no longer in use.

The Assessment Program report referenced in the preceding paragraph also contains an excellent discussion of site geology. The higher groundwater levels in the north and northeast part of the site seem to be controlled by an underlying silt/clay/sand unit. This lower permeability unit is found only in the northeast part of the site under a 20-25 foot thick sand and gravel unit. Groundwater over this unit has a higher elevation than areas to the south and southwest where there is a much thicker sequence of sand and gravel. See figures 7 through 14, and figure 16 for cross-sections and maps related to geology and groundwater flow.

Vertical gradients are well documented at this site because of the excellent system of well clusters found here. Vertical gradients are important in relation to the question of whether the low levels of arsenic detected in some wells comes from the impoundments or is naturally occurring deeper in the aquifer. Although there are variations, most wells clusters show a downward gradient from the shallowest well ("A") to the next deeper one ("B") for wells 11, 12, 13, 15, 16. For well clusters with a deep well ("C"), there is an

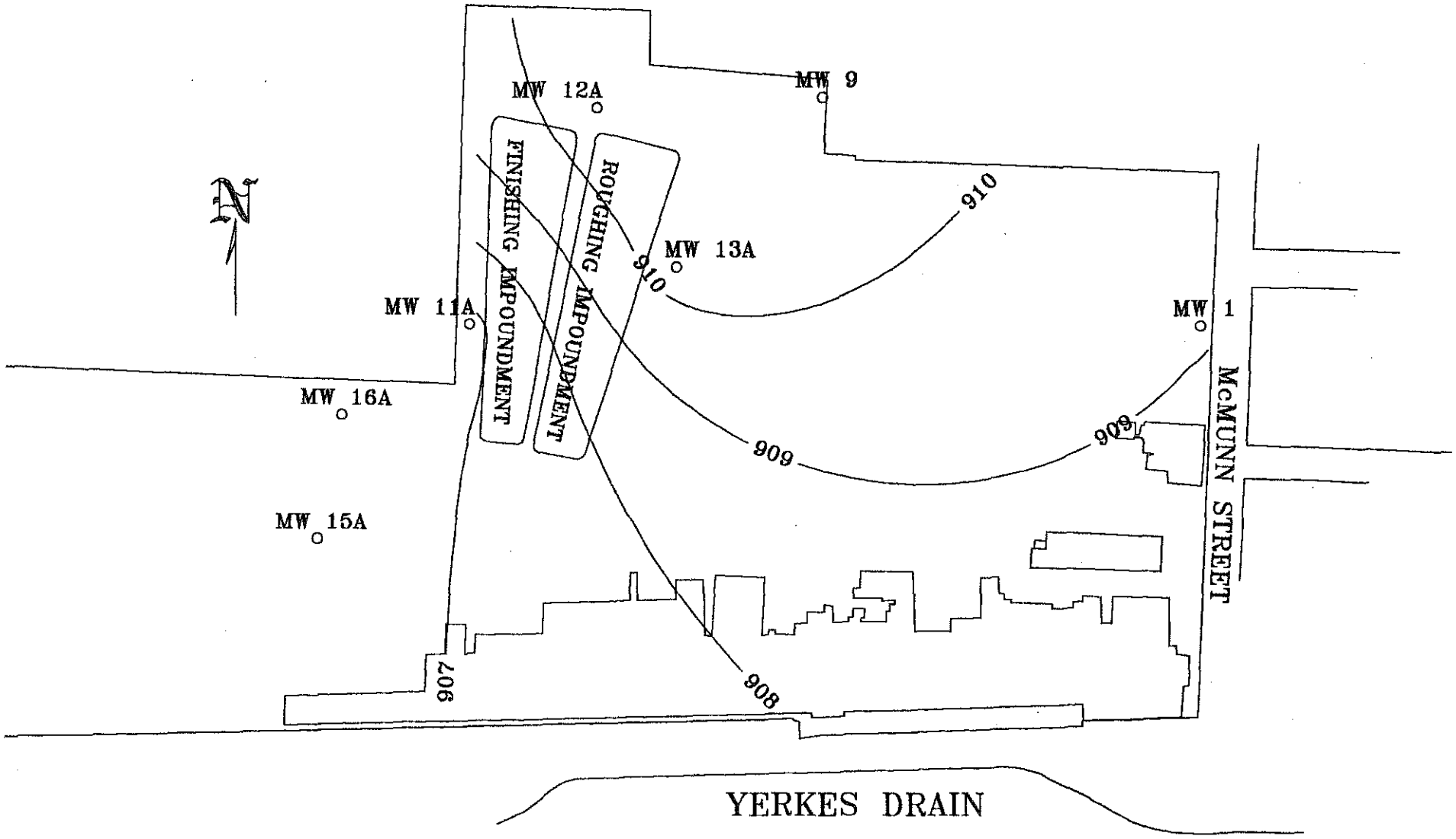
upward gradient from the deepest (C) to the mid-level (B) well (MW 12, 13). For well cluster 11, there are four wells at various depths. There is a downward gradient from shallow (A) to mid (B and C), and usually an upward gradient from the deepest (D) to the "C" well. There is a question however regarding the top of casing elevation. For example, for well 11D, the Groundwater Assessment Report (4/86) listed the TOC elevation as 921.07, the 1988 Annual GW report has 920.77, and the 1990 Annual GW report lists 921.77. The overall difference of 1.0 feet can make a large difference in the interpretation of vertical gradients.

The vertical gradient question is important regarding the source of the arsenic and 1,1 dichloroethane found in wells 11A and 11B, and the arsenic found occasionally in wells 11D, 12B, 13A, 13B, and 14A. It is possible that the arsenic may have come from the impoundments because arsenic is detected in well 11A on some occasions, and in 11B consistently. There is a consistent downward gradient from 11A to 11B. Arsenic was also detected consistently in well 14A until its removal. Wells 11A, 13A, and 14A are shallow.

Other evidence however points to the arsenic possibly being naturally occurring deeper in the aquifer, perhaps related to the silt/clay/sand unit. For example, arsenic has not been detected in well 12A, but is consistently found in well 12B. There is a downward gradient from 12A to 12B, but no arsenic in 12A. There is an upward gradient from 12C to 12B. Well 11D also consistently has detectable arsenic, and there is an upward gradient. For a summary refer to the 1990 Annual Groundwater Report (dated 2/21/91) done by WW Engineering & Science which contains a historic summary of water level data and analytical results. Copies of the arsenic and 1,1 dichloroethane data are included in this section of the O&M report.

There is also another possible source for the 1,1 dicloro-ethane found in wells 11A and 11B. Soil boring logs and excavation related to closure of the impoundments revealed the existence of a former landfill. The impoundments southern portions are constructed over the landfill, which contains organics as revealed by testing of the landfill waste. Only wells 11A and 11B detect the 1,1 DCEa, while other wells around the impoundments do not. Other wells also detect the 1,1 DCEa, but they are farther from the landfill and impoundments. Well 6A has shown higher levels in the past compared to 11A and 11B. This may be due to an as yet unknown source.

GROUNDWATER CONTOUR MAP OF SHALLOW WELLS AT QUANEX



STATICS TAKEN ON 12/20/90 BY QUANEX
CONTOUR INTERVAL: 1 FOOT

SCALE 1 inch = 250 Feet

1990 Annual G.W. Report

Figure 1

Contour of the Intermediate Depth Piezometric Surface (B Wells)

Quanex
Michigan Seamless Tube Division

November, 1990 20515.01

LEGEND

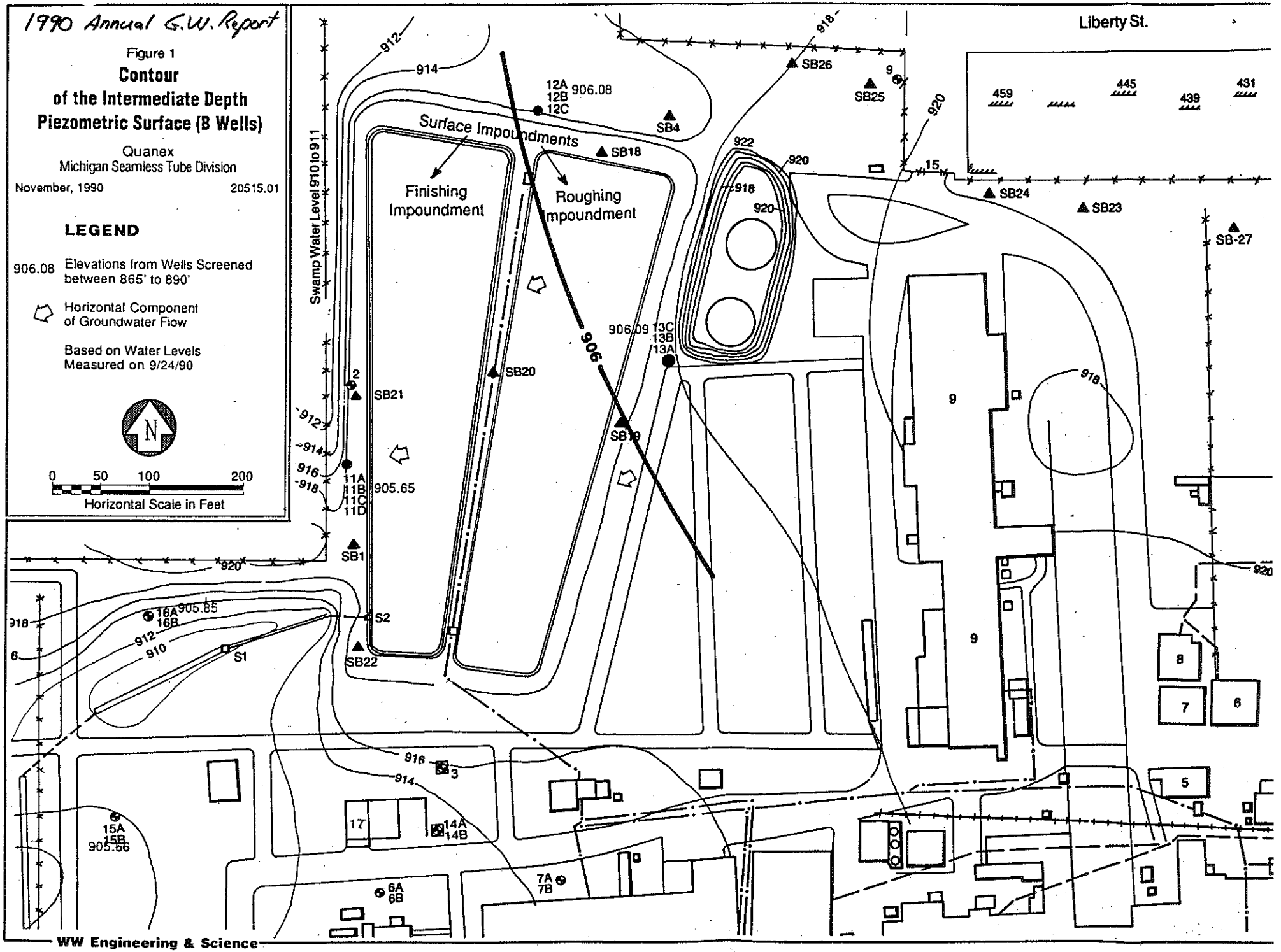
906.08 Elevations from Wells Screened between 865' to 890'

Horizontal Component of Groundwater Flow

Based on Water Levels Measured on 9/24/90

N

0 50 100 200
Horizontal Scale in Feet



WW Engineering & Science

GROUND WATER MONITORING DATA

1990 ANNUAL REPORT (dated 2/21/91)
WW Engineering + Science

Ground Water Quality Assessment Plan Monitoring

Arsenic, dissolved (ug/l)

SAMPLED FROM -	TO	1	6-A	9	11-A	11-B	11-D	12-A	12-B	13-A	13-B	14-A	15-A	16-A	FIELD BLANK	TRIP BLANK
10/17/86		< 2.0			< 2.0	4.2	5.6	< 2.0	5.3	< 2.0	5.2	6.4		< 2.0	< 2.0	< 2.0
12/22/86						6.3	6.9		16		11	11				
12/22/86						7.8	6.0		15		13	13				
12/22/86						17	5.9		20		16	18				
03/11/87	03/12/87	< 2.0		< 2.0	< 2.0	3.3	4.6	< 2.0	9.5	< 2.0	5.0	9.3		< 2.0	< 2.0	< 2.0
05/18/87	05/19/87	< 2.0			< 2.0	2.4	5.3	< 2.0	9.3	< 2.0	7.6	8.7		< 2.0	< 2.0	
05/18/87	05/19/87					3.5	5.6		11		6.3	4.8				
05/18/87	05/19/87					4.0	5.4		11		6.6	4.8				
08/18/87	08/19/87	< 2.0			< 2.0	4.9	5.9	< 2.0	9.4	< 2.0	5.9	8.6		< 2.0	< 2.0	
11/12/87		< 2.0			< 2.0	3.7	4.6	< 2.0	9.2	< 2.0	5.6	8.4		< 2.0		< 2.0
11/12/87						3.5	5.5		9.1		5.4	9.8				
11/12/87						4.2	4.8		8.9		5.2	8.7				
02/10/88		< 2.0			2.1	4.0	6.0	< 2.0	8.0	< 2.0	5.5	6.6		< 2.0	< 2.0	< 2.0
05/10/88		< 2.0	4.1		5.4	3.9	6.7	< 2.0	6.4	< 2.0	8.5	plugged	< 2.0	< 2.0	< 2.0	
05/10/88					6.4	4.2	8.1		8.0		9.1					
05/10/88					7.7	4.1	10		7.6		9.5					
08/10/88		< 2.0	7.9		< 2.0	4.0	6.7	< 2.0	7.1	< 2.0	5.4		< 2.0	< 2.0	< 2.0	
08/10/88			9.1													
08/10/88			9.2													
11/03/88		< 2.0	13		2.2	2.3	7.5	< 2.0	10	< 2.0	8.5		< 2.0	< 2.0		
11/03/88						< 2.0	5.5		8.6		9.5					
11/03/88						< 2.0	7.3		8.1		8.6					
03/26/90	03/27/90	< 2.0			< 2.0	2.9	5.1	< 2.0	6.7	2.1	4.6		< 2.0	< 2.0	< 2.0	< 2.0
06/18/90		< 2.0			2.4	4.1	5.4	< 2.0	7.6	< 2.0	4.9		< 2.0	< 2.0	< 2.0	< 2.0
06/18/90	dup					2.7	5.6		9.0	3.0	4.7		"			
06/18/90	trip					3.2	6.1		9.8	2.6	5.2					
06/18/90	quad					3.3	5.7		6.8	3.0	4.6					
09/24/90		< 2.0			3.1	3.0	4.1	< 2.0	5.4	3.0	4.6		< 2.0	< 2.0	< 2.0	< 2.0
09/24/90	dup				3.5											
09/24/90	trip				3.7											
12/20/90		< 2.0			5.3	4.6	6.5	< 2.0	7.7	2.7	5.7		< 2.0	< 2.0	< 2.0	< 2.0
12/20/90	dup				4.5	4.1	6.4		6.1	4.3	5.6					
12/20/90	trip				3.9	3.5	5.4		6.8	6.2	5.5					

1990 ANNUAL REPORT (dated 2/21/91)
WW Engineering + Science

GROUND WATER MONITORING DATA

Ground Water Quality Assessment Plan Monitoring
1,1-Dichloroethane (ug/l)

SAMPLED FROM -	TO	1	6-A	9	11-A	11-B	11-D	12-A	12-B	13-A	13-B	14-A	15-A	16-	FIELD BLANK	TRIP BLANK
10/17/86	(note 1)	< 2			6	6	< 2		< 2							< 2
12/22/86		< 1			3.0	5.1										
12/22/86		< 1			3.4	4.9										
12/22/86					3.6	4.7										
03/11/87	03/12/87	< 1		< 1	< 1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
05/18/87	05/19/87	< 1			3.0	2.1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1		
05/18/87	05/19/87					2.2										
05/18/87	05/19/87					2.3										
08/18/87	08/19/87	< 1			9.9	6.1	< 1	< 1	< 1	< 1	< 1	1.1	< 1	< 1		
08/18/87	08/19/87				5.2											
08/18/87	08/19/87				4.7											
11/12/87		< 1			4.1	5.3	< 1	< 1	< 1	< 1	< 1	1.2	< 1	< 1	< 1	< 1
11/12/87						5.5						1.4				
11/12/87						5.2						1.1				
02/10/88		< 1		BROKE BTL		3.5	< 1	< 1	< 1	< 1	< 1	1.2	< 1			< 1
02/10/88					1.8											
02/10/88				< 1												
05/10/88		< 1	42		1.0	3.4	< 1	< 1	< 1	< 1	< 1	plugged	< 1	< 1	< 1	
05/10/88						3.5										
05/10/88						3.8										
08/10/88		< 1	42		3.7	3.0	< 1	< 1	< 1	< 1	< 1		< 1	< 1		
08/10/88			58		3.6											
08/10/88			53		3.7											
11/03/88		< 1	70	< 1		4.5	< 1	< 1	< 1	< 1	< 1		< 1	< 1		
11/03/88						4.5										
11/03/88						4.4										
03/26/90	03/27/90	< 1			2	< 1	< 1	< 1	< 1	< 1	< 1		< 1	< 1	< 1	< 1
06/18/90		< 1			3	3	< 1	< 1	< 1	< 1	< 1		< 1	< 1	< 1	< 1
06/18/90	dup				3											
06/18/90	trip				3											
06/18/90	quad				3											
09/24/90		< 1			2	3	< 1	< 1	< 1	< 1	< 1		< 1	< 1	< 1	< 1
09/24/90	dup					2										
09/24/90	trip					2										
12/20/90		< 1			2	3	< 1	< 1	< 1	< 1	< 1		< 2	< 2	< 2	< 2
12/20/90	dup				3	3										
12/20/90	trip				3	4										

Additional Reviews

QUANEX O&M INSPECTION
2/27/91
TOTAL vs DISSOLVED METALS

Since there is an ongoing debate as to whether groundwater samples should be filtered or not, samples were taken at three wells for both total metals (not filtered, preserved in the field with acid) and for dissolved metals (field filtered and then preserved). This is also a relevant question since the recent EPA proposal is to deny the delisting petition submitted by Quanex for the liquid portion of its waste. Previously, the sludge from lime stabilization of pickle liquor sludge was delisted. EPA based part of the proposed denial on samples EPA took on 8-26-87 that apparently were not filtered which detected chromium and lead. Historical data from Quanex and from two MDNR samplings have not shown any statistically significant problem that I am aware of with chromium or lead as referenced in the EPA proposed denial (Federal Register, Vol. 55, No 224, Tuesday November 20, 1990). For a recent groundwater data summary, refer to the 1990 Annual Groundwater Report by WW Engineering & Science. Copies of the chromium and lead data are included here.

The three wells where total and dissolved metals Michigan DNR samples were taken are 11A, 11B, and 1 (the upgradient well). For the following metals, all total and dissolved results were non-detect at the detection level in mg/l noted in parenthesis: Cadmium (0.02), Chromium (0.05), Copper (0.02), Nickel (0.05), Lead (0.05).

The data for zinc shows inconsistent results. Two of the three wells had non-detect zinc in the <u>total</u> analysis while having detectable levels in the dissolved (MW-11A, 11B). For well MW-1, the upgradient well, there was zinc detected in the dissolved phase, and very high zinc in the total analysis. It must be noted that the other wells are PVC, while MW-1 has galvanized casing. The elevated zinc in MW-1 is likely related to the casing.

For iron, the data shows that the total analysis had at least twice the amount as the dissolved analysis. This is not surprising since iron is a common metal associated with clay and silt particles. It may be important at this site because arsenic, which is detected in some wells, can be controlled by adsorption on hydrous iron oxide (USGS Water-Supply Paper 2254, Study and Interpretation of the Chemical Characteristics of Natural Water, Third Edition, by Hem). The arsenic may be associated with the high iron content of the groundwater (see attached data on iron).

For arsenic, the total level is higher than the dissolved level in all three wells. In the upgradient well, the dissolved arsenic was non-detect (at 0.001 mg/l). Overall, the data for arsenic, iron, and zinc show that there can be a substantial difference in metals levels depending on how the sample is taken. How much sediment is in the groundwater sample will affect total versus dissolved analysis.

1990 ANNUAL REPORT (dated 2/21/91)
WW Engineering + Science

GROUND WATER MONITORING DATA

Ground Water Quality Assessment Plan Monitoring

Chromium, dissolved (mg/l)

SAMPLED FROM -	TO	1	6-A	9	11-A	11-B	11-D	12-A	12-B	13-A	13-B	14-A	15-A	16-A	FIELD BLANK	TRIP BLANK
10/17/86		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05
03/11/87	03/12/87	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05
05/18/87	05/19/87	< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	
08/18/87	08/19/87	< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	
11/12/87		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05		< 0.05
02/10/88		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05
05/10/88		< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	plugged	< 0.05	< 0.05	< 0.05	
08/10/88		< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	
11/03/88		< 0.08	< 0.08		< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08		< 0.08	< 0.08		
03/26/90	03/27/90	0.06			< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05
06/18/90		0.06			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.08		< 0.05	< 0.05	0.08	< 0.05
06/18/90	dup	0.06					0.06									
06/18/90	trip	0.06					0.06									
06/18/90	quad	0.08					0.08									
09/24/90		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05
09/24/90	dup										< 0.05					
09/24/90	trip										< 0.05					
12/20/90		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05

↑
upgradient well

1990 ANNUAL REPORT (dated 2/21/91)
WW Engineering + Science

GROUND WATER MONITORING DATA

Ground Water Quality Assessment Plan Monitoring

Lead, dissolved (mg/l)

SAMPLED FROM -	TO	1	6-A	9	11-A	11-B	11-D	12-A	12-B	13-A	13-B	14-A	15-A	16-A	FIELD BLANK	TRIP BLANK
10/17/86		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05
03/11/87	03/12/87	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05
05/18/87	05/19/87	< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	
08/18/87	08/19/87	< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	
11/12/87		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05		< 0.05
02/10/88		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05
05/10/88		< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	plugged	< 0.05	< 0.05	< 0.05	
08/10/88		< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	
11/03/88		< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05		
03/26/90	03/27/90	< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05
06/18/90		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05
09/24/90		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05
12/20/90		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05

GROUND WATER MONITORING DATA
Ground Water Quality Assessment Plan Monitoring
Annual Parameters (mg/l)

Well	Date	Chloride	Sulfate	Manganese	Iron
1	10/17/86	130	2400	1.1	3.5
1	11/12/87	65	900	0.84	4.8
1	11/03/88	150	674	0.59	6.5
1	06/18/90	76	744	0.61	4.2
6-A	11/03/88	85	1380	0.11	22
11-A	10/17/86	36	880	0.27	0.1
11-A	11/12/87	57	690	0.62	2.6
11-A	11/03/88	60	823	0.46	0.84
11-A	06/18/90	97	886	0.52	2.3
11-B	10/17/86	37	920	0.31	1.5
11-B	11/12/87	99	800	0.42	2.6
11-B	11/03/88	61	837	0.35	0.57
11-B	06/18/90	134	900	0.49	5
11-D	10/17/86	48	150	0.05	1.7
11-D	11/12/87	55	120	0.04	1.9
11-D	11/03/88	65	134	0.04	2.6
11-D	06/18/90	66	176	0.06	2.8
12-A	10/17/86	35	540	0.03	< 0.01
12-A	11/12/87	62	370	0.03	0.04
12-A	11/03/88	59	637	< 0.01	< 0.01
12-A	06/18/90	74	824	0.06	< 0.01
12-B	10/17/86	69	540	0.10	3.4
12-B	11/12/87	66	540	0.13	4.4
12-B	11/03/88	63	547	0.11	3.6
12-B	06/18/90	65	606	0.16	4.5
13-A	10/17/86	45	2900	0.96	6.1
13-A	11/12/87	42	1330	0.87	6.3
13-A	11/03/88	67	1290	0.81	6.1
13-A	06/18/90	56	698	0.92	9
13-B	10/17/86	39	860	0.22	4.3
13-B	11/12/87	62	890	0.31	7.7
13-B	11/03/88	58	992	0.25	8.5
13-B	06/18/90	151	870	0.31	7
14-A	10/17/86	140	610	0.12	11
14-A	11/12/87	130	390	0.16	21

GROUND WATER MONITORING DATA
Ground Water Quality Assessment Plan Monitoring
Annual Parameters (mg/l)

Well	Date	Chloride	Sulfate	Manganese	Iron
15-A	11/03/88	38	460	< 0.01	< 0.01
15-A	06/18/90	11	74	< 0.01	< 0.01
16-A	10/17/86	37	500	0.18	0.05
16-A	11/12/87	73	610	0.08	0.07
16-A	06/18/90	70	759	0.08	< 0.01
EQP BLK	10/17/86	6.2	< 5	< 0.01	< 0.01
EQP BLK	11/12/87	< 1	< 5		< 0.01
EQP BLK	06/18/90	< 2	< 5	< 0.01	< 0.01
TRP BLK	10/17/86	3.8	< 5	< 0.01	< 0.01
TRP BLK	11/12/87	1.9	< 5	< 0.01	< 0.01
TRP BLK	06/18/90	< 2	< 5	< 0.01	< 0.01
EPA STD		250	250	0.05	0.3

QUANEX O&M INSPECTION
2/27/91
STIFF and PIPER DIAGRAMS

Stiff and Piper Diagrams were constructed for the six wells that MDNR split sampled. Four of the six wells, MW 1, 11A, 11B, and 13B, have very similar chemistry. The other two are only slightly different. MW-13A has relatively more bicarbonate (HCO3) as compared to the first four wells listed. Well 11D, the deepest of the wells represented in MDNR samples has less overall dissolved solids, and has more bicarbonate than sulfate. This difference can be seen graphically in the attached stiff diagrams and Piper Trilinear diagrams.

There is little evidence of impacts on groundwater quality related to the impoundments. One explanation for relatively higher bicarbonate in 13A is discharge from the pond of water with higher HCO3 content related to the lime treatment that occurred in the past. In all wells except the deep MW-11D, sulfate is the dominant anion. In fact, the natural shallow groundwater quality in this area appears to be high in sulfate. The higher bicarbonate in well 11D may be the natural state of groundwater deeper in the aquifer. Wells 11A and 11B, which are shallower than 11D do not show higher bicarbonate. The deeper groundwater quality does appear to be different than shallow groundwater chemistry.

CHEMISTRY ANALYSIS

PROJECT: QUANEX FILE: 1
LOCATION: SOUTH LYON

WELL NO.: MW11A

CATIONS	PPM	EPM	% EPM
Ca	325.00	16.22	72.13
Mg	32.90	2.71	12.03
Na+K	86.40	3.56	15.84

ANIONS	PPM	EPM	% EPM
HCO3+CO3	156.00	2.56	11.28
SO4	832.00	17.32	76.41
Cl	99.00	2.79	12.31

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 0.60 %
SODIUM ABSORPTION RATION (S.A.R.): 1.07

WELL NO.: MW11B

CATIONS	PPM	EPM	% EPM
Ca	339.00	16.92	72.29
Mg	40.20	3.31	14.13
Na+K	75.80	3.18	13.58

ANIONS	PPM	EPM	% EPM
HCO3+CO3	170.00	2.79	11.43
SO4	873.00	18.18	74.57
Cl	121.00	3.41	14.00

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 1.69 %
SODIUM ABSORPTION RATION (S.A.R.): 0.95

MICHIGAN DEPT. OF NATURAL RESOURCES

CHEMISTRY ANALYSIS

PROJECT: QUANEX FILE: 1
LOCATION: SOUTH LYON

WELL NO.: MW11D

CATIONS	PPM	EPM	% EPM
Ca	142.00	7.09	65.05
Mg	36.00	2.96	27.18
Na+K	20.45	0.85	7.76

ANIONS	PPM	EPM	% EPM
HCO3+CO3	284.00	4.65	45.88
SO4	177.00	3.69	36.33
Cl	64.00	1.80	17.79

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 4.04 %
SODIUM ABSORPTION RATION (S.A.R.): 0.35

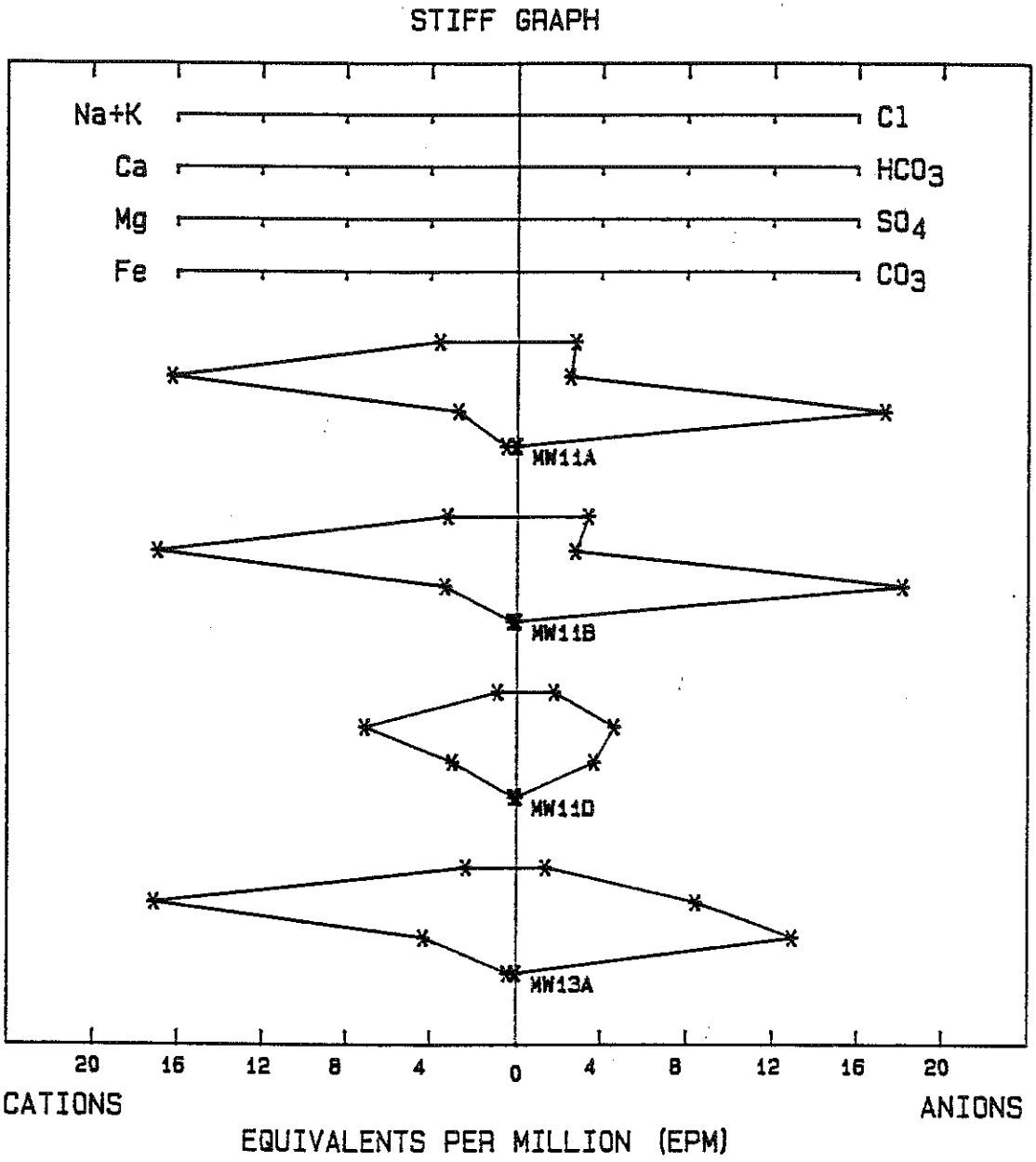
WELL NO.: MW13A

CATIONS	PPM	EPM	% EPM
Ca	342.00	17.07	72.14
Mg	52.00	4.28	18.08
Na+K	55.70	2.31	9.78

ANIONS	PPM	EPM	% EPM
HCO3+CO3	517.00	8.47	37.00
SO4	624.00	12.99	56.72
Cl	51.00	1.44	6.28

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 2.37 %
SODIUM ABSORPTION RATION (S.A.R.): 0.66

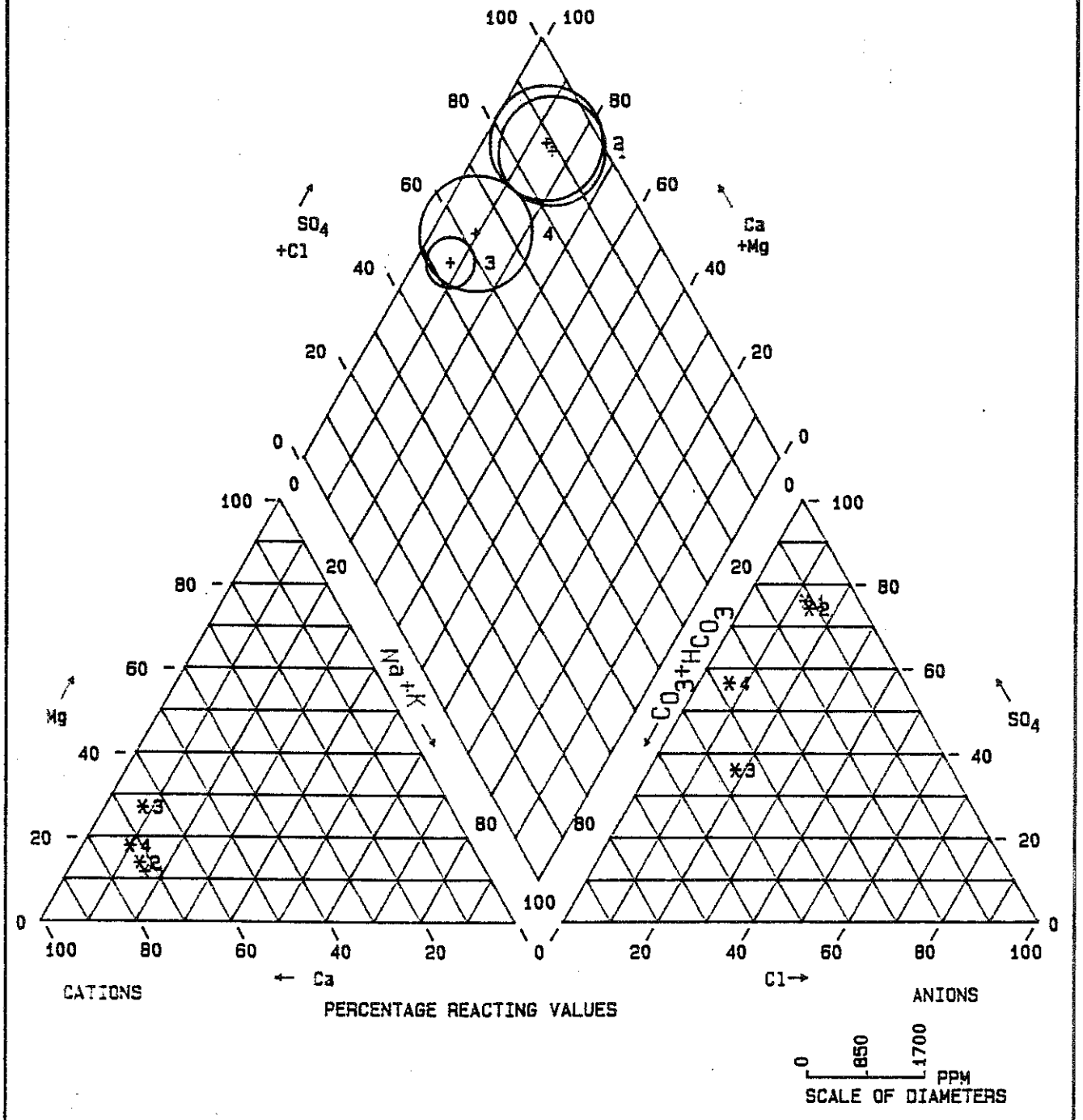
MICHIGAN DEPT. OF NATURAL RESOURCES



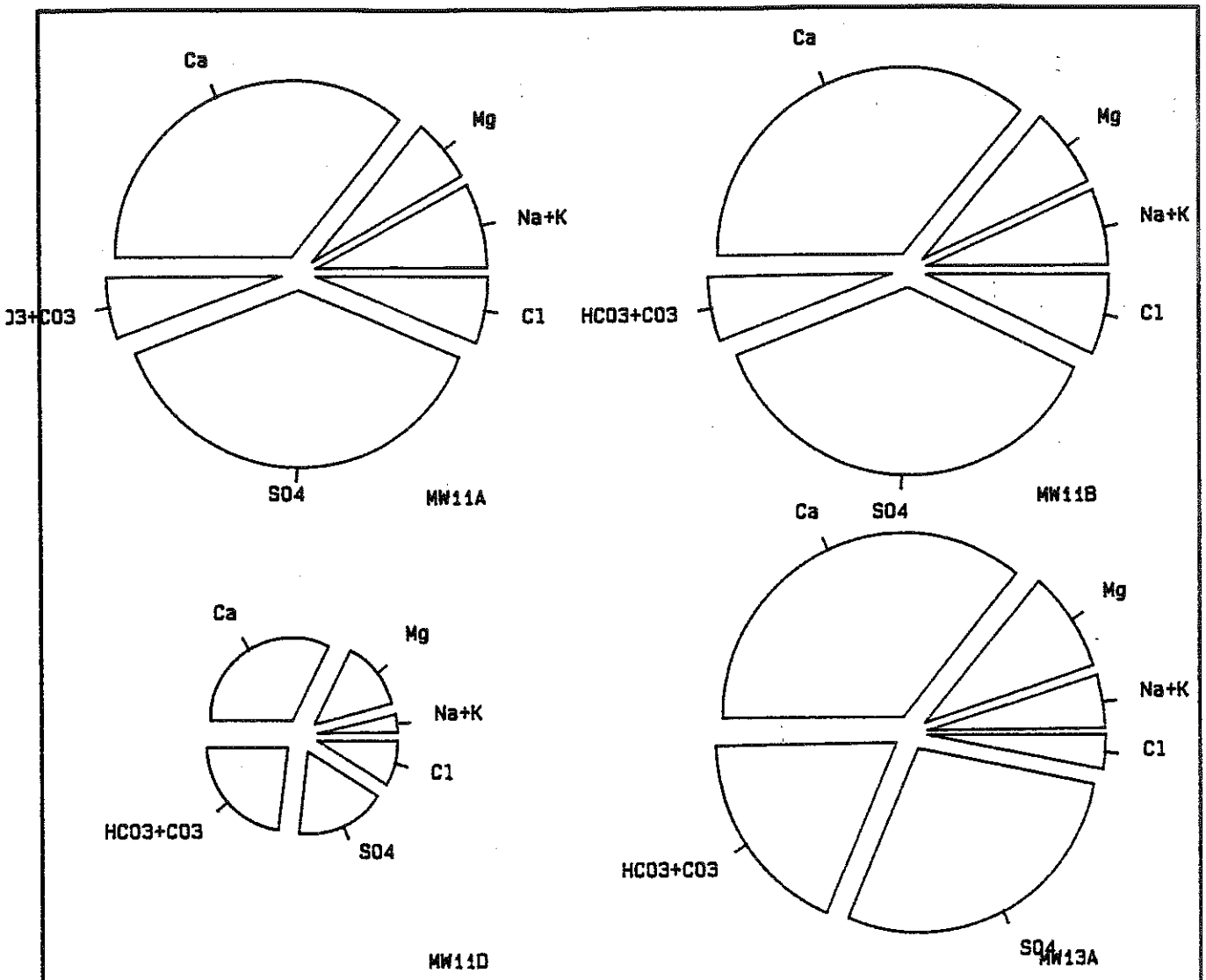
PROJECT: Quanex
FILE: 1
LOCATION: South Lyon

MICHIGAN DEPT. OF NATURAL RESOURCES

FIGURE: 1



PROJECT: Quanex FILE: 1 LOCATION: South Lyon	PIPER TRILINEAR DIAGRAM
MICHIGAN DEPT. OF NATURAL RESOURCES	FIGURE: 2



0 25 50

SCALE OF RADII
(TOTAL OF EQUIVALENTS
PER MILLION)

NOTE ERROR (IF ANY) IN CATION/ANION
BALANCE HAS BEEN REMOVED

PROJECT: Quanex FILE: 1 LOCATION: South Lyon	PIE DIAGRAMS SHOWING WATER QUALITY
MICHIGAN DEPT. OF NATURAL RESOURCES	FIGURE: 3

CHEMISTRY ANALYSIS

PROJECT: QUANEX FILE: 1
LOCATION: SOUTH LYON

WELL NO.: MW13A

CATIONS	PPM	EPM	% EPM
Ca	342.00	17.07	72.14
Mg	52.00	4.28	18.08
Na+K	55.70	2.31	9.78

ANIONS	PPM	EPM	% EPM
HCO3+CO3	517.00	8.47	37.00
SO4	624.00	12.99	56.72
Cl	51.00	1.44	6.28

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 2.37 %
SODIUM ABSORPTION RATION (S.A.R.): 0.66

WELL NO.: MW13B

CATIONS	PPM	EPM	% EPM
Ca	312.00	15.57	66.46
Mg	45.00	3.70	15.80
Na+K	97.50	4.16	17.74

ANIONS	PPM	EPM	% EPM
HCO3+CO3	216.00	3.54	15.16
SO4	759.00	15.80	67.68
Cl	142.00	4.00	17.15

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 0.69 %
SODIUM ABSORPTION RATION (S.A.R.): 1.30

MICHIGAN DEPT. OF NATURAL RESOURCES

CHEMISTRY ANALYSIS

PROJECT: QUANEX FILE: 1
LOCATION: SOUTH LYON

WELL NO.: MW1

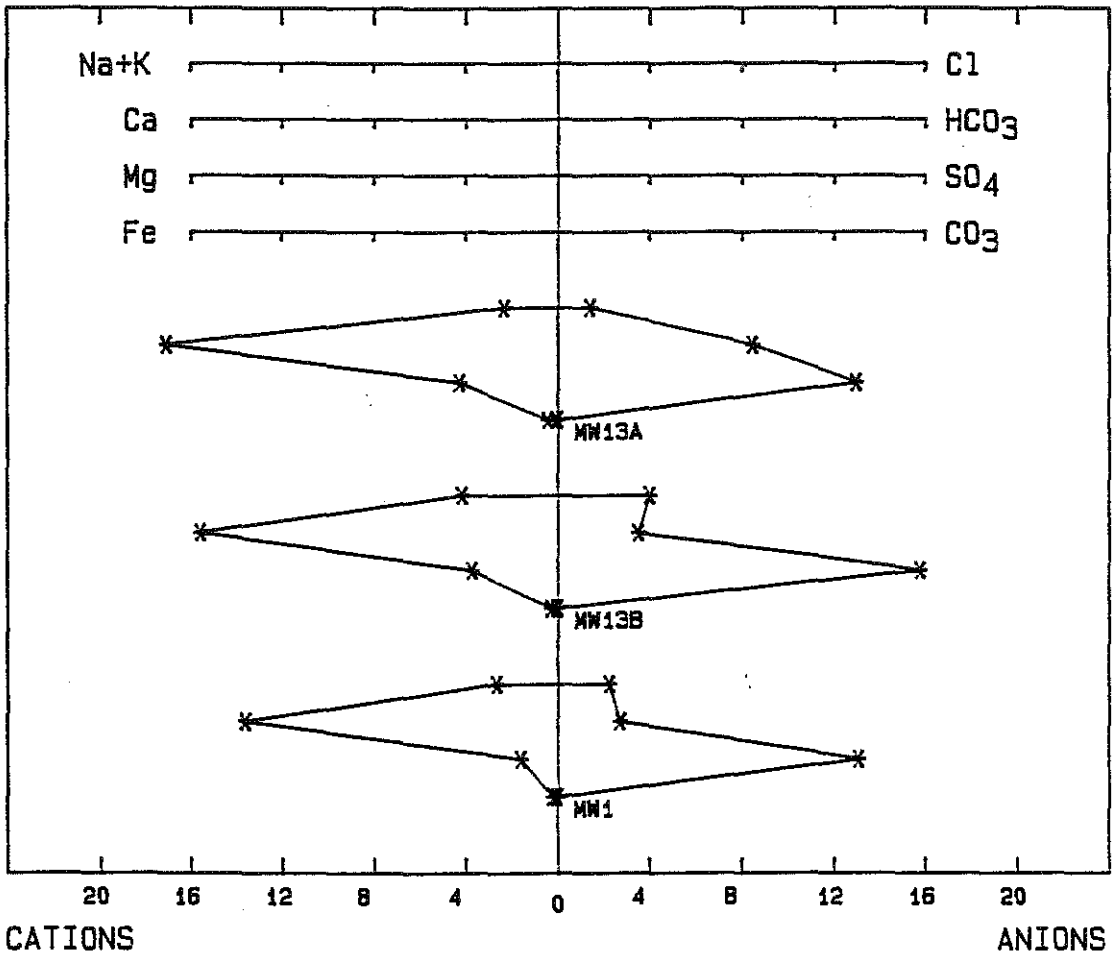
CATIONS	PPM	EPM	% EPM
Ca	272.00	13.57	76.34
Mg	19.00	1.56	8.79
Na+K	63.10	2.64	14.87

ANIONS	PPM	EPM	% EPM
HCO3+CO3	169.00	2.77	15.26
SO4	629.00	13.10	72.15
Cl	81.00	2.28	12.59

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 0.55 %
SODIUM ABSORPTION RATION (S.A.R.): 0.91

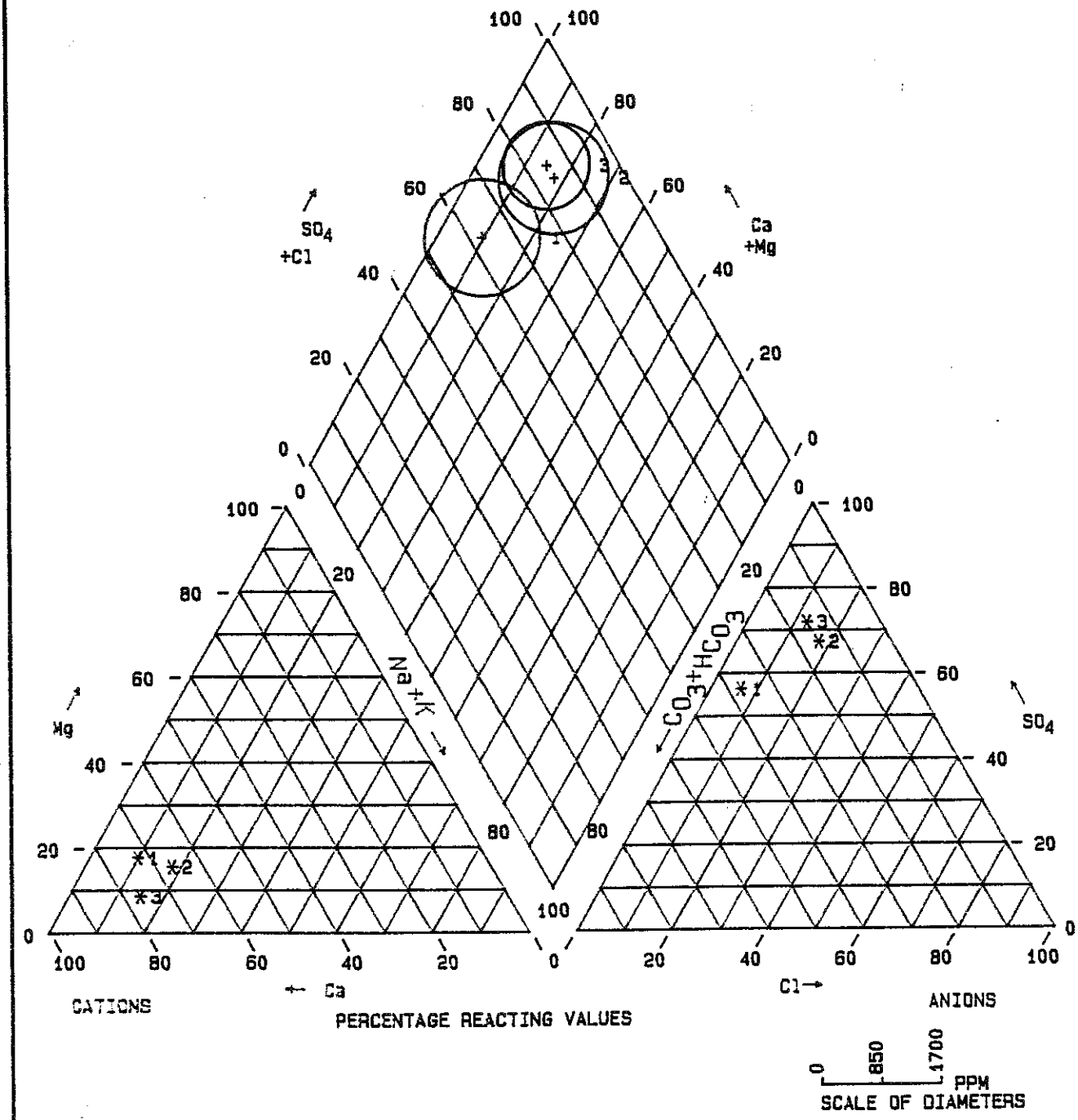
MICHIGAN DEPT. OF NATURAL RESOURCES

STIFF GRAPH

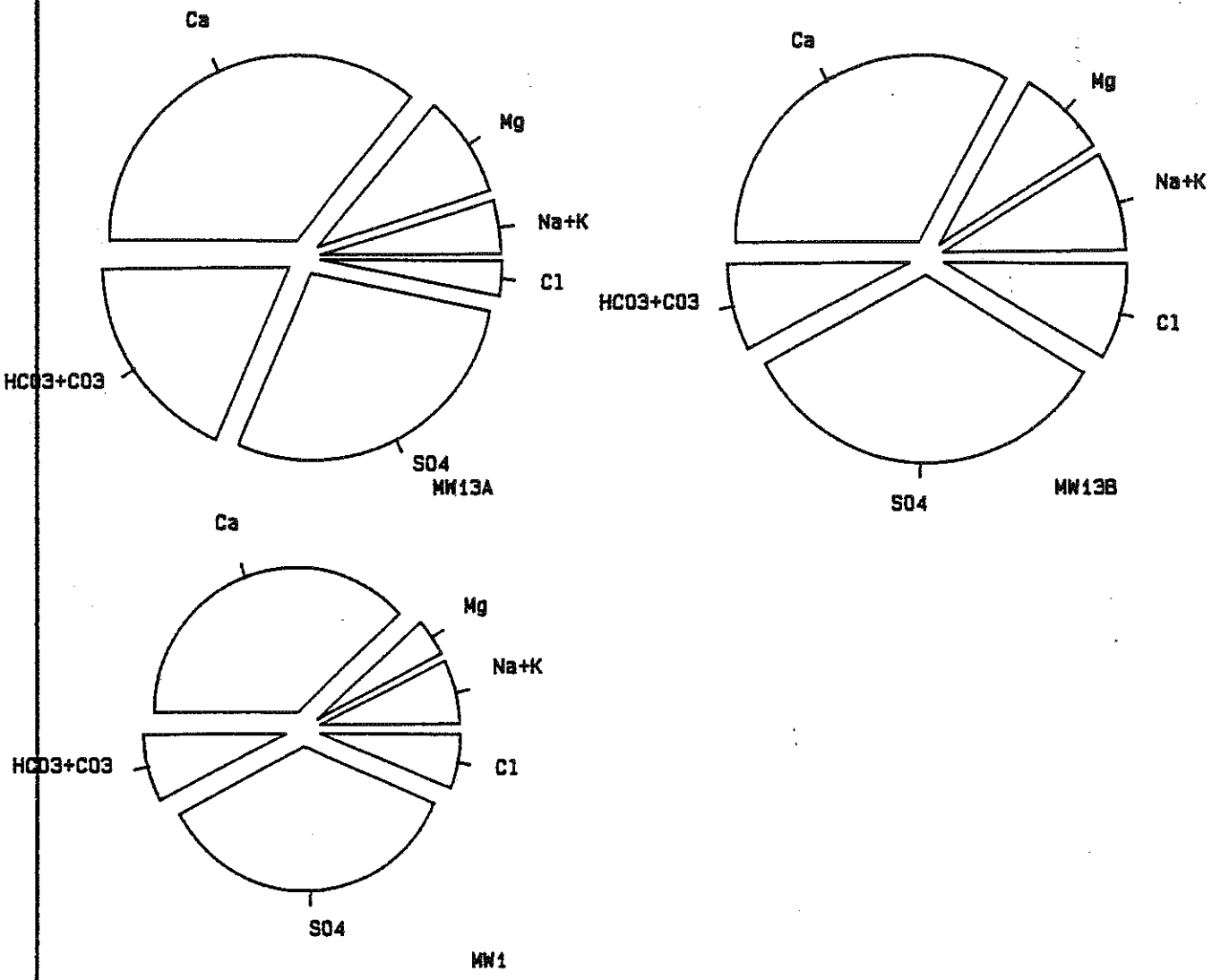


EQUIVALENTS PER MILLION (EPM)

PROJECT: QUANEX FILE: 2 LOCATION: SOUTH LYON	
MICHIGAN DEPT. OF NATURAL RESOURCES	FIGURE: 4



PROJECT: QUANEX FILE: 2 LOCATION: SOUTH LYON	PIPER TRILINEAR DIAGRAM
MICHIGAN DEPT. OF NATURAL RESOURCES	FIGURE: 5



0 25 50

SCALE OF RADII
(TOTAL OF EQUIVALENTS
PER MILLION)

NOTE ERROR (IF ANY) IN CATION/ANION
BALANCE HAS BEEN REMOVED

PROJECT: QUANEX FILE: 2 LOCATION: SOUTH LYON	PIE DIAGRAMS SHOWING WATER QUALITY
MICHIGAN DEPT. OF NATURAL RESOURCES	FIGURE: 6

QUANEX O&M INSPECTION
2/27/91
REVIEW OF 1990 ANNUAL GROUNDWATER REPORT

The Waste Management Division of Michigan DNR received the Annual Groundwater Report covering 1990 on 2/21/91. The report has been reviewed as part of this inspection. The report deals with the question of arsenic, the origin of the 1,1 dichloroethane, and groundwater flow evaluation. The report states that a "fundamental change in the monitoring program is necessary". This O&M inspection deals specifically with these issues in the list of items that Quanex must address.

Water Level Evaluation:

Groundwater flow direction, both horizontally and vertically has been well established at this site. There is a good system of vertical well clusters. Groundwater flow has been consistently to the west or southwest. Vertical gradient have been relatively consistent. There is a downward gradient from shallow to mid-level, and an upward gradient from deep wells to the mid-level ones.

However, there is a problem related to the top-of-casing elevations. In reviewing the water level measurement contained in the First Quarter 1990 Report dated 5/7/90, the vertical gradients are not consistent with the conventional wisdom as explained in the preceding paragraph. Checking of other records shows that the top-of-casing elevations for the wells has changed. For example, well 11D elevations:

T.O.C.	date	Report
921.07	4/86	Groundwater Assessment Report
920.77	1/89	1988 Annual Groundwater Report
921.77	2/91	1990 Annual Groundwater Report

Depending on which elevation is current, the vertical gradient could be much different. This will greatly affect the question of arsenic origin. The difference in elevation must be explained.

1,1 Dichloroethane:

I agree that the likely source of the 1,1, dichloroethane is the landfill (SWMU) found directly under the southern portion of the former impoundments. All evidence to date supports that conclusion. There are also other possible sources. For example, well 6A has shown in the past consistently higher levels of 1,1, DCEa. Since this appears to be a more widespread problem, it would be appropriate to address this contaminant under the HSWA program.

Arsenic:

With regards to arsenic, I agree with the statement that a fundamental change is needed in the monitoring program to answer the question of source. There is evidence of upward gradients at the impoundments, and arsenic is present is mid to deep level wells. However, arsenic is also present in shallow wells 6A, 11A, 13A, and 14A. Arsenic is also present in mid-level wells 11B, 12B, and 13B. For 11B there is a consistent downward gradient from shallow (11A) to 11B, and from 11B to 11C. If the gradient is consistently downward, how did arsenic from 11D get to 11B? For 13B, there is a downward gradient from shallow well 13A, and 13A has shown detectable arsenic.

Part of the data gap is for wells 12C and 13C. Proof of arsenic detected in these deep wells would be invaluable. All of the proof of arsenic is also from wells located next to the impoundments. There is no data from deep in the aquifer away from the impoundments. Upgradient data from the deep aquifer would also be invaluable. Therefore, sampling of well 12C and 13C will be requested, along with installation of an upgradient deep well.

Proposal to Include Well 11D In Upgradient Data:
I do not agree with combining data from 11D and upgradient well 1. This will not necessarily represent the background concentration of arsenic deep in the aquifer. First, the wells are constructed of different materials. Well 11D is PVC, and well 1 has galvanized casing. Second, the wells are set at different depths. Third, the shallow groundwater chemistry is different than the deeper portion of the aquifer as noted in the 1990 Annual Report on page 3. I believe it is preferable to install a new upgradient well in the deeper part of the aquifer.

In summary, the 1990 Annual Groundwater Report does contain a proposal to address the arsenic question. I agree that a change in monitoring is needed, but not along the lines proposed. The O&M inspection will request that Quanex submit another proposal.

Summary Letter and EPA Reporting Forms

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

February 27, 1991

TO: Ben Okwumabua, Supervisor
Southeast Michigan District, WMD

FROM: Jan Sealock JS
David Slayton DS
Geotechnical Unit, WMD

SUBJECT: Summary Memo - 1991 O&M Inspection
Quanex Corporation
MID 082 767 591

An O&M inspection has been conducted at Quanex Corporation of South Lyons. The inspection includes a field overview of the company's consultant as they sampled, an audited split sampling of groundwater (on 12/20/90), a sampling & analysis plan review, groundwater flow direction review, Stiff/Piper/Pie diagrams, Annual report review, and O&M checklists.

The attachment to this memo lists violations and areas of concern that need to be addressed by Quanex. This list can be attached to the summary letter that the District sends to the company. A draft summary letter from the District to the company is included in the O&M package for your use.

The company must continue the quarterly assessment monitoring until a permit is issued (post-closure/HSWA), or the facility is clean closed as approved by MDNR. In line with the ongoing assessment monitoring, the company must conduct further study in regards to the question of whether or not the low levels of arsenic detected in some wells is naturally occurring or not. The question of the 1,1 dichloroethane detected in some wells should be addressed in the HSWA permit when it is issued. This parameter does not appear to be attributable to the RCRA Units.

The hazardous waste container storage area is closed, and the certification approved by MDNR. The company started closure of the two RCRA impoundments, but work stopped after solidification of sludge while a delisting petition for the treated liquid waste was submitted to EPA. EPA proposes to deny the delisting. EPA also conducted a VSI in the fall of 1990 as part of an RFA. A revised closure plan is to be submitted by Quanex in regards to the impoundments. Then there will probably need to be a post-closure/HSWA permit. If there are any questions, please contact Jan Sealock at (517)373-4740, or David Slayton at (517)373-8012.

cc: De Montgomery
HWP/C&E file
Geotech file

ATTACHMENT

Quanex Corporation
MID 082 767 591
O&M Inspection - February 27, 1991

1. The sampling and analysis plan (April 1986, Groundwater Quality Assessment Program) must be updated to include the following items:

   a) Detection limits for all required parameters. [Violation - 40 CFR 265.92(a)(3)]

   b) Laboratory QA/QC procedures (spikes, duplicates, standards). [Violation - 265.92(a)(3)]

   c) Specify purge method, fate of purged water, how purge volume is calculated. [Violation - 265.92(a)(1)]

   d) Specify correct analytical methods for dissolved oxygen, nitrate-nitrite, and organic carbon. [Violation - 265.92(a)(3)]

   e) Inspection of well casing, protective casing, surface pad, and lock during routine sampling events. Provisions to repair any damage must be included. [Area of concern]

2. The company must supply additional data supporting its claim that the arsenic detected in some wells is naturally occurring. The company must submit a proposal within 90 days for additional well(s) and sampling. The proposal in the 1990 Annual Groundwater report is not adequate (see discussion in text of O&M writeup). The proposal must address the following: [Area of Concern -265.93(d)(4)(i)]

   a) Installation of a new deep well at MW-1.
   b) Sampling of deep well 12C and 13C.
   c) Explanation of different top of casing elevations.
   d) Analysis of vertical gradients to geochemistry.

3. The 1,1 dichloroethane contamination must be addressed. The most obvious vehicle is to address this contaminant is through the HSWA process. EPA has already started the RFA. The 1,1 dichloroethane found in low levels in wells 11A and 11B may be related to a SWMU found directly under the southern part of the RCRA impoundments. Another source may also be present at the site because well 6A has shown consistently higher levels, and this well is located farther away from the impoundments. The RFI to be eventually conducted under HSWA must include addressing the 1,1 dichloroethane. [Area of concern]

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

June 30, 1988

TO: Ben Okwumabua, District Supervisor
Northville Office, WMD

FROM: David Slayton, Geologist DS
Geotechnical Unit, WMD

SUBJECT: Quanex Corporation, South Lyons, MID 082 767 591
CME Summary

This summary is for the Comprehensive Monitoring Evaluation (CME) conducted at Quanex. Monitor wells were split sampled between DNR and the company in February 1988. Liz Browne sent her review comments to Lynne King in a memo dated 3/17/88. This summary includes the items Liz noted in her review, plus additional ones developed during data review. Liz's memo does have more detail.

1. The sampling and analysis plan contained in the April 1986 Groundwater Assessment plan needs to be updated to reflect actual field procedures used and additional information as detailed below.

   a. The plan must include details on the method used to determine the purge volume, the method of measuring purged water removed, and disposal of purge water.

   b. The plan must include information on the EDI laboratory QA/QC program such as use of spikes, duplicates, and standards.

   c. Table 13 must include detection limits, and the method references must be checked and updated to be consistent with SW-846, Third edition and Standard Methods 16th edition. Methods referenced in error are dissolved oxygen, nitrate-nitrite, and organic carbon, and specific methods are needed for metals.

   d. The plan must be updated to include details on any field measurements taken, as well as the method and schedule of meter calibration. Information must be included on field filtering methods, and decontamination of this equipment.

   e. Clarification is needed on the time elapsed between purging and sampling of wells, and the plan should specify precautions taken when sampling for volatile organics to minimize aeration, such as lowering the bailer slowly.

2. Since the consultant, EDI Engineering & Science, concludes that the aresenic levels detected in some wells is naturally occurring, we must now proceed to verify. The company must submit a proposal on

how they intend to show that the arsenic is naturally occurring by October 1, 1988.

3. The company should propose what steps, if any, will be taken to remediate the 1,1-dichloroethane. This should be submitted by October 1, 1988, also. Is the fuel oil recovery still in progress, and if so, would it capture the 1,1-dichloroethane?

4. The company must explain why the First Quarter 1988 Report dated 4/8/88 only had resampling done on 4 parameters (see attachment D of that report). Resampling is to be done if the concentration of a constituent in a well measured during the fourth quarter 1987 was above the mean background concentration and above the detection limit. The annual report dated 1/29/88 lists eleven (11) parameters that were above background in the fourth quarter of 1987. Therefore, all should have been resampled in the first quarter of 1988. The company must explain this perceived discrepancy.

5. When the impoundments are excavated, the area around soil boring SB-22, at the southwest corner of the west impoundment, must be excavated to remove the material noted on the boring log. The log from 9.5-15 feet lists wood, black, oily, tar odor, and pieces of metal. This must be removed at closure.

In summary, no major deficiencies were found. The groundwater monitoring program being conducted is of good quality. The sampling and analysis plan needs to be updated to include some specifics on actual field procedures, and there needs to be a resolution of the arsenic and 1, 1 dichloroethane contamination questions. Please contact me if there are any questions.

cc: Ms. Marilyn Sabadaszka, Region V, U.S. EPA
Ms. Andrea Schoenrock/C & E File
Geotech Unit File

FY 1988 HAZARDOUS WASTE COMPLIANCE MONITORING AND ENFORCEMENT LOG

1. EPA ID: MI D008276759 1 | 4. Data Entry: New [4]

2. HANDLER NAME: Duanor Corp. | Update [ ]

3. ADDRESS: 400 McMunn, South Lyon, MI

5. DATE OF INITIAL EVALUATION WHICH IS THE BASIS FOR THIS REPORT: 6/19/88

5a. AGENCY RESPONSIBLE FOR EVALUATION: Put code in box [S]

E = EPA S = State C = Contractor/EPA O = Other B = Contractor/State X = Oversight

6. TYPE OF EVALUATION COVERED BY THIS REPORT: Select Evaluation Type and insert in box: [4]

1 = Compliance Eval. Inspection (CEI) 2 = Sampling Inspection 3 = Record Review 4 = Comp GWM Eval (CME) 5 = Compliance Sched. Eval 11 = Case Dev. Inspection 12 = O&M Inspection

7. DATE OF EVALUATION COVERED BY THIS REPORT (enter only if different from 5): __/__/__

7a. Eval. Comments: No major deficiencies; sampling + analysis plan needs minor revisions to reflect actual field procedures.

8. CLASS and VIOLATIONS

Key	Class of Violation	Violations/Releases: GWM/RLSE	C/FC	Fin.Res	Pt. B	Compl.Sch	Manifest	Land-Ban	Other
'I'=Violations, no Specialties									
'S'=Violations & Specialty	I	0							
'S'=Same Viol./Specialty									
'Z'=Pending determination	II	0							
'0'=No Viol or Specialty found	Acceptable Codes								
		X	X	X	X	X	X	X	X
Specialties		S	S	S	S	S	S	S	S
		Z	Z	Z	Z	Z	Z	Z	Z
'I' = No-insurance only		0	0	0	0	0	0	0	0
'C' = Cl Schedule Violation		B*		I*		C			
'R' = 3008(h)-like release		B*		B*		B			
* = Class I only									

8a Viol. Comment: _____

9. ENFORCEMENT ACTIONS:

Class	Area of Viol/rel.	Type (use code)	Date Action Taken	Compliance Dates: Scheduled	Compliance Dates: Actual	Penalty: Assessed	Penalty: Collected	Resp.Ag. (use code)

Codes for Types of Enforcement Actions: 03 = Warning Letter; 04 = Admin. Complaint; 05 = Final Admin. Order; 10 = Informal; 11 = Filed Civil Action; 12 = Filed Criminal Action; 18 = Civil Referral to AG/DOJ; 19 = Final Judicial Order; 15 = Cl Init. Admin. Order; 16 = Cl Final Admin. Order

Resp Agcy Codes: E = EPA; S = State; X = EPA Oversight

10. Enforc. Comment: _____

FY 1988 FACILITY STATUS SHEET

1.a. EPA ID: MI0082767591

2.a. Date Status Sheet Submitted 6/30/88

b. Facility Name: Quanex Corp.

b. First Time Report ✓ Update _

This form only applies to facilities that have some form of land disposal. Of these facilities, complete this form for only those facilities that are not on a permit track for their land disposal.

3. Facility Ground Water Monitoring Status (Choose one) [A]
D = 265 Detection
A = 265 Assessment
W = Waiver (Hydrogeologic)
N = GWM Not Required
X = No wells but should have

4. GWM Activity Reported with this Submission (More than one Activity can be reported on a single Status Sheet)	Respon. Agency E=EPA S=State	Date Compliance Status Determined	Compliance Status Y=Compliance N=Non-Compl. U=UnderReview	Date Report Submitted	Hazardous Waste Constituent (HWC) Flag Y=HWC in GW N=No HWC in GW
01 Evaluation of Installation of Well System	S	6/30/88	Y	XXXXXXXXXX	XXXXXXXXXXXXXXX
02 Evaluation of Sampling, Analysis and Evaluation Program	S	6/30/88	Y	XXXXXXXXXX	XXXXXXXXXXXXXXX
03 Notice of Significant Increase in Concentrations		XXXXXXXXXX	XXXXXXXXXXXXX		XXXXXXXXXXXXXXX
04 Groundwater Quality Assessment Report		XXXXXXXXXX	XXXXXXXXXXXXX		
05 Waiver Demonstration				XXXXXXXXXX	XXXXXXXXXXXXXXX
06 GWM Records	S	6/30/88		XXXXXXXXXX	XXXXXXXXXXXXXXX
07 Evaluation of Hydrogeologic Information	S	6/30/88		XXXXXXXXXX	XXXXXXXXXXXXXXX

GWM Comment: Good program in place, sampling + analysis adequate, assessment program in progress.

5. Financial Requirements	Respon. Agency	Date Compliance Status Determined or: N = Not Evaluated X = Not Applicable	Compliance Status Y= Compliance N= Non-Compliance B= Bankruptcy
C = Closure Assurance			
L = Post Closure Assurance			
S = Sudden Liability Instrument			
N = Non-Sudden Liability Instrument			
R = Corrective Action Assurance Instrument			

Financial Comment: _____

QUANEX CORPORATION
MID 082 767 591
CME FILE

MAY 19, 1988

SUBJECT: Evaluation of Quanex Corporation's statistics for annual report 1987 and first quarter report 1988.

When MDNR calculated out the data using a statistical program for T-test on the computer, the same results were encountered that EDI Engineering and Science reported in the 1987 annual report and first quarterly report of 1988.

Within the EDI 1987 annual report (dated 1-29-87) the following monitoring wells showed significant increases in arsenic: 11-B, 11-D, 12-B, 13-B, 14-A. Significant increases in 1,1-DCA were noted in monitoring wells 11-B and 14-A. The T-test computer program used to check company data confirmed EDI calculations for significant increases of arsenic and 1,1-DCA.

In analyzing EDI data from the first quarter 1988 report (dated 4-8-88) and again applying the T-test program, we found the same results which EDI calculated. No significant increases were found in the following monitoring wells and listed parameters which were suspect due to the previous quarter's sampling results:

11-A	1,1-DCA
12-A	Selenium
12-A	Copper
16-A	Copper

In summary, the data presented in the two reports have been found to be accurate. No problems were encountered in the company's calculations of the t-test with continuity correction.

Although the calculations and statistics are correct, there is a problem with proceedures under the groundwater assessment monitoring program. The first quarter 1988 report dated 4/8/88 from EDI states that if the concentration of a constituent measdured during the fourth quarter 1987 was above the mean background concentration, and above the detection limit, then that well was purged and sampled during the Feb. 1988 sampling. Only four samples were "rechecked". The annual report dated 1/29/88 lists eleven parameters in various wells that measured above the mean background and the detection limit. All eleven of these should have been rechecked in the next quarter (Feb 1988).

An. Report 1987

GNIFICANT INCREASE IN ARSENIC

CILITY
IANEX

CKGROUND WELL

SAMPLE PARAMETER
ARSENIC

MPLE DATA	READING	X	DELTA
-DEC-83	1	.5	.5
-MAR-84	10	5	5
-JUN-84	1	1	.5
-SEP-84	1	.5	.5
-SEP-85	1	.5	.5
-OCT-85	4.4	4.4	.05
-OCT-86	2	1	1
-MAR-87	1	.5	.5
-MAY-87	2	1	1
-AUG-87	2	1	1
-NOV-87	2	1	1

CKGROUND STATISTICS

	MEAN	VARIANCE	LLVOM
1	1.490909	3.599326	.6875569

WNGRADIENT WELL
B

SAMPLE PARAMETER
ARSENIC

MPLE DATE	READING	X	DELTA
-AUG-87	4.9	4.9	.05
-NOV-87	3.7	3.7	.05
-NOV-87	3.7	3.7	.05
-NOV-87	4.2	4.2	.05

WNGRADIENT WELL STATISTICS

	MEAN	VARIANCE	LLVOM
	4.125	.3236107	.000625

MPARISION STATISTICS

PHA	T*	Tc
01	3.004832	2.951081

An. Report 1987

IGNIFICANT INCREASE IN ARSENIC

ACILITY
'ANEX

ACKGROUND WELL

SAMPLE PARAMETER
ARSENIC

AMPLE DATA	READING	X	DELTA
3-DEC-83	1	.5	.5
4-MAR-84	10	5	5
)-JUN-84	1	1	.5
7-SEP-84	1	.5	.5
4-SEP-85	1	.5	.5
3-OCT-85	4.4	4.4	.05
7-OCT-86	2	1	1
1-MAR-87	1	.5	.5
3-MAY-87	2	1	1
3-AUG-87	2	1	1
2-NOV-87	2	1	1

ACKGROUND STATISTICS

	MEAN	VARIANCE	LLVOM
11	1.490909	3.599326	.6875569

DWNGRADIENT WELL
1D

SAMPLE PARAMETER
ARSENIC

AMPLE DATE	READING	X	DELTA
7-AUG-87	5.9	5.9	.05
JOV-87	4.6	4.6	.05
2-NOV-87	5.5	5.5	.05
2-NOV-87	4.8	4.8	.05

DWNGRADIENT WELL STATISTICS

	MEAN	VARIANCE	LLVOM
4	5.2	.3677824	.000625

OMPARISION STATISTICS

_PHA	T*	Tc
.01	4.201059	2.973605

An. Report 1987

IGNIFICANT INCREASE IN ARSENIC

ACILITY
JANEX

ACKGROUND WELL
SAMPLE PARAMETER
ARSENIC

AMPLE DATA	READING	X	DELTA
3-DEC-83	1	.5	.5
3-MAR-84	10	5	5
0-JUN-84	1	1	.5
7-SEP-84	1	.5	.5
4-SEP-85	1	.5	.5
3-OCT-85	4.4	4.4	.05
7-OCT-86	2	1	1
1-MAR-87	1	.5	.5
3-MAY-87	2	1	1
3-AUG-87	2	1	1
2-NOV-87	2	1	1

ACKGROUND STATISTICS

	MEAN	VARIANCE	LLVOM
11	1.490909	3.599326	.6875569

OWNGRADIENT WELL
2B
SAMPLE PARAMETER
ARSENIC

AMPLE DATE	READING	X	DELTA
9-AUG-87	9.4	9.399999	.05
2-NOV-87	9.2	9.2	.05
2-NOV-87	9.1	9.100001	.05
2-NOV-87	8.9	8.899999	.05

OWNGRADIENT WELL STATISTICS

	MEAN	VARIANCE	LLVOM
4	9.149999	4.445625E-02	.000625

OMPARISION STATISTICS

LPHA	T*	Tc
.01	9.163067	2.792267

An. Report 1987

SIGNIFICANT INCREASE IN ARSENIC

FACILITY
QUANEX

BACKGROUND WELL	SAMPLE PARAMETER
1	ARSENIC

SAMPLE DATA	READING	X	DELTA
23-DEC-83	1	.5	.5
14-MAR-84	10	5	5
20-JUN-84	1	1	.5
27-SEP-84	1	.5	.5
24-SEP-85	1	.5	.5
23-OCT-85	4.4	4.4	.05
17-OCT-86	2	1	1
11-MAR-87	1	.5	.5
18-MAY-87	2	1	1
18-AUG-87	2	1	1
12-NOV-87	2	1	1

BACKGROUND STATISTICS

n	MEAN	VARIANCE	LLVOM
11	1.490909	3.599326	.6875569

DOWNGRADIENT WELL	SAMPLE PARAMETER
13B	ARSENIC

SAMPLE DATE	READING	X	DELTA
19-AUG-87	5.9	5.9	.05
2-NOV-87	5.6	5.6	.05
12-NOV-87	5.4	5.4	.05
12-NOV-87	5.2	5.2	.05

DOWNGRADIENT WELL STATISTICS

n	MEAN	VARIANCE	LLVOM
4	5.525	9.028094E-02	.000625

COMPARISION STATISTICS

ALPHA	T*	Tc
.01	4.787156	2.820479

An. Report 1987

SIGNIFICANT INCREASE IN arsenic

FACILITY
quanex

BACKGROUND WELL	SAMPLE PARAMETER
1	arsenic

SAMPLE DATA	READING	X	DELTA
23-dec-83	1	.5	.5
14-mar-84	10	5	5
20-june-84	1	1	.5
27-sept-84	1	.5	.5
24-sept-85	1	.5	.5
23-oct-85	4.4	4.4	.05
17-oct-86	2	1	1
11-mar-87	1	.5	.5
18-may-87	2	1	1
18-aug-87	2	1	1
12-nov-87	2	1	1

BACKGROUND STATISTICS

N	MEAN	VARIANCE	LLVOM
11	1.490909	3.599326	.6875569

DOWNGRADIENT WELL	SAMPLE PARAMETER
4A	arsenic

SAMPLE DATE	READING	X	DELTA
19-aug-87	8.6	8.600001	.05
12-nov-87	8.4	8.399999	.05
12-nov-87	9.8	9.8	.05
12-nov-87	8.7	8.7	.05

DOWNGRADIENT WELL STATISTICS

N	MEAN	VARIANCE	LLVOM
4	8.875	.3969445	.000625

COMPARISION STATISTICS

ALPHA	T*	Tc
.01	8.324665	2.988128

An. Report 1987

SIGNIFICANT INCREASE IN 1,1-DCA

FACILITY
QUANEX

BACKGROUND WELL	SAMPLE PARAMETER
1	1,1-DCA

SAMPLE DATA	READING	X	DELTA
24-SEP-85	1	.5	.5
17-OCT-86	2	1	1
22-DEC-86	1	.5	.5
22-DEC-86	1	.5	.5
11-MAR-87	1	.5	.5
18-MAY-87	1	.5	.5
18-AUG-87	1	.5	.5
12-NOV-87	1	.5	.5

BACKGROUND STATISTICS

n	MEAN	VARIANCE	LLVOM
8	.5625	.1622024	.0859375

DOWNGRADIENT WELL	SAMPLE PARAMETER
11B	1,1-DCA

SAMPLE DATE	READING	X	DELTA
19-AUG-87	6.1	6.1	.05
12-NOV-87	5.3	5.3	.05
12-NOV-87	5.5	5.5	.05
12-NOV-87	5.2	5.2	.05

DOWNGRADIENT WELL STATISTICS

n	MEAN	VARIANCE	LLVOM
4	5.525	.1636147	.000625

COMPARISION STATISTICS

ALPHA	T*	Tc
.01	13.93383	3.495586

Ann. Report 195

NO SIGNIFICANT INCREASE IN 1,1-DCA

FACILITY
QUANEX

BACKGROUND WELL	SAMPLE PARAMETER
1	1,1-DCA

SAMPLE DATA	READING	X	DELTA
24-SEP-85	1	.5	.5
17-OCT-86	2	1	1
22-DEC-86	1	.5	.5
22-DEC-86	1	.5	.5
11-MAR-87	1	.5	.5
18-MAY-87	1	.5	.5
18-AUG-87	1	.5	.5
12-NOV-87	1	.5	.5

BACKGROUND STATISTICS

n	MEAN	VARIANCE	LLVOM
8	.5625	.1622024	.0859375

DOWNGRADIENT WELL	SAMPLE PARAMETER
14A	1,1-DCA

SAMPLE DATE	READING	X	DELTA
19-AUG-87	1.1	1.1	.05
12-NOV-87	1.2	1.2	.05
12-NOV-87	1.4	1.4	.05
12-NOV-87	1.1	1.1	.05

DOWNGRADIENT WELL STATISTICS

n	MEAN	VARIANCE	LLVOM
4	1.2	2.111109E-02	.000625

COMPARISION STATISTICS

ALPHA	T*	Tc
.01	2.110797	3.087279

1st Quarter 19

NO SIGNIFICANT INCREASE IN COPPER

FACILITY
UANEX

BACKGROUND WELL	SAMPLE PARAMETER
1	COPPER

SAMPLE DATA	READING	X	DELTA
23-OCT-85	.01	.005	.005
17-OCT-86	.02	.02	.005
11-MAR-87	.01	.005	.005
18-MAY-87	.01	.005	.005
19-AUG-87	.01	.005	.005
12-NOV-87	.01	.005	.005
10-FEB-88	.01	.005	.005

BACKGROUND STATISTICS

n	MEAN	VARIANCE	LLVOM
7	7.142857E-03	4.18651E-05	6.25E-06

DOWNGRADIENT WELL	SAMPLE PARAMETER
16A	COPPER

SAMPLE DATE	READING	X	DELTA
12-NOV-87	.03	.03	.005
10-FEB-88	.01	.005	.005
10-FEB-88	.01	.005	.005
10-FEB-88	.01	.005	.005

DWNGRADIENT WELL STATISTICS

n	MEAN	VARIANCE	LLVOM
4	.01125	1.673611E-04	6.25E-06

COMPARISION STATISTICS

ALPHA	T*	Tc
.01	.5922583	4.35931

1st Quarter 198

NO SIGNIFICANT INCREASE IN COPPER

FACILITY
QUANEX

BACKGROUND WELL	SAMPLE PARAMETER
1	COPPER

SAMPLE DATA	READING	X	DELTA
23-OCT-85	.01	.005	.005
17-OCT-86	.02	.02	.005
11-MAR-87	.01	.005	.005
18-MAY-87	.01	.005	.005
19-AUG-87	.01	.005	.005
12-NOV-87	.01	.005	.005
10-FEB-88	.01	.005	.005

BACKGROUND STATISTICS

n	MEAN	VARIANCE	LLVOM
7	7.142857E-03	4.18651E-05	6.25E-06

DOWNGRADIENT WELL	SAMPLE PARAMETER
12A	COPPER

SAMPLE DATE	READING	X	DELTA
12-NOV-87	.01	.01	.005
10-FEB-88	.01	.005	.005
10-FEB-88	.01	.005	.005
10-FEB-88	.01	.005	.005

DOWNGRADIENT WELL STATISTICS

n	MEAN	VARIANCE	LLVOM
4	.00625	1.736112E-05	6.25E-06

COMPARISION STATISTICS

ALPHA	T*	Tc
.01	-.252538	3.842

1st Quarter 198

NO SIGNIFICANT INCREASE IN SELENIUM

FACILITY
QUANEX

BACKGROUND WELL	SAMPLE PARAMETER
1	SELENIUM

SAMPLE DATA	READING	X	DELTA
23-DEC-83	10	5	5
14-MAR-84	1	.5	.5
20-JUN-84	10	5	5
27-SEP-84	10	5	5
24-SEP-85	1	.5	.5
23-OCT-85	2	1	1
17-OCT-86	2	1	1
11-MAR-87	2	1	1
18-MAY-87	2	1	1
18-AUG-87	2	2	.05
12-NOV-87	2	1	1
10-FEB-88	2.4	2.4	.05

BACKGROUND STATISTICS

n	MEAN	VARIANCE	LLVOM
12	2.116667	5.757426	1.677188

DOWNGRADIENT WELL	SAMPLE PARAMETER
12A	SELENIUM

SAMPLE DATE	READING	X	DELTA
12-NOV-87	2.9	2.9	.05
10-FEB-88	10	10	.5
10-FEB-88	11	11	.5
10-FEB-88	11	11	.5

DOWNGRADIENT WELL STATISTICS

n	MEAN	VARIANCE	LLVOM
4	8.725001	15.3861	4.703125E-02

COMPARISION STATISTICS

ALPHA	T*	Tc
.01	2.811748	3.987475

1st Quarter 1988

NO SIGNIFICANT INCREASE IN 1-1-DCA

FACILITY
QUANEX

BACKGROUND WELL	SAMPLE PARAMETER
1	1-1-DCA

SAMPLE DATA	READING	X	DELTA
24-SEP-85	1	.5	.5
17-OCT-86	2	1	1
22-DEC-86	1	.5	.5
22-DEC-86	1	.5	.5
11-MAR-87	1	.5	.5
18-MAY-87	1	.5	.5
18-AUG-87	1	.5	.5
12-NOV-87	1	.5	.5
10-FEB-88	1	.5	.5

BACKGROUND STATISTICS

n	MEAN	VARIANCE	LLVOM
9	.5555556	.1527778	8.333334E-02

DOWNGRADIENT WELL	SAMPLE PARAMETER
11A	1-1-DCA

SAMPLE DATE	READING	X	DELTA
12-NOV-87	4.1	4.1	.05
10-FEB-88	1.8	1.8	.05
10-FEB-88	1	.5	.5

DOWNGRADIENT WELL STATISTICS

n	MEAN	VARIANCE	LLVOM
3	2.133333	3.365834	.02125

COMPARISION STATISTICS

ALPHA	T*	Tc
.01	1.43715	6.683668

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

March 17, 1988

TO: Lynne King, Northville District Office, WMD

FROM: Liz Browne, HW Permits, WMD

SUBJECT: Quanex Corp., Michigan Seamless Tube Division
South Lyons, MID 082 767 591

On February 10, 1988 I conducted a sampling inspection at this facility as part of a Comprehensive Monitoring Evaluation (CME). Although no violations of 40 CFR 265.92 [as referenced in Act 64 R299.11003(m)] were found at this time, concerns were noted and are mentioned within the following inspection summary.

EDI Engineering and Science of Grand Rapids conducts all field and laboratory work for the facility. The Ground Water Quality Assessment Program, dated April, 1986, authored by EDI, contained the Sampling and Analysis Plan (SAP) that was used for this review.

Static water level readings are taken with a steel tape to the nearest 0.01 foot. The readings are taken to the top of the casing, and not to the top of the locking cap. Although this is stated in the plan, it should be emphasized to field staff should personnel change. Measurements compared reasonably well with those obtained with the DNR meter.

Purging is accomplished using either stainless steel or teflon bottom filling bailers and polypropelene rope. A new bailer, steam cleaned prior to the site visit, with new rope attached at the time of purging is used. Three casing volumes are purged prior to sampling. The purge water is directed into a graduated bucket to enable a volume measurement, and to facilitate the disposal of the water away from the well. The methods used to determine purge volume needed, method of measuring purge volume removed, and the disposal of the purge water should all be addressed in the plan.

Samples are obtained using the same equipment as, and immediately after, purging, where recovery allows. The plan states that the wells should be sampled within 24 hours of purging. Sampling immediately after purging is the preferable method. If this is not possible, recovery rates should be determined for each well, and sampling done as soon as sufficient volume exists.

Field measured parameters include pH and specific conductance. The meters are calibrated at the beginning of the day. The plan only mentions pH as a field parameter, and does not address the meter calibration. The plan should be updated to reflect field conditions. Other

field work includes the filtering of the metals sample immediately upon collection, prior to preservation. These are all excellent field methods to attempt to maintain the integrity of unstable parameters.

Field QA/QC procedures include the use of clean bailers and new line as already mentioned. Additionally, trip and equipment blanks and sample replicates are used to evaluate the sampling program. These are all good measures to help to assure that representative samples are taken. One item of concern noted during the sampling was the handling of the bailer during volatile organic sampling. The bailer should be lowered carefully for all sample collection, to reduce aeration, but especially for the volatile organics. A note to emphasize this may be appropriate in the plan. Other items of potential concern were not noted during this inspection. The sampling crew appeared to be familiar with the plan, worked carefully, and kept adequate field notes.

Chain of custody appears to be well documented. Field notes, bottle labels, a chain of custody form and an Analytical Services Project Sheet are used to track all samples. Copies of all forms have been included in the plan. Good control can be maintained since sample requests, bottle orders, sampling and analysis are all handled by EDI.

A list of sample parameters with sample container, preservation, holding time, minimum sample size and method references is included in the plan. A table indicating the detection limit attainable by EDI's laboratory is needed to complete this set of information. Also, the method references for some parameters appear to be in error. The Standard Methods reference should be 421, not 412 for dissolved oxygen. Nitrate-nitrite should be method 353 for reference 3, not 201. Reference 3 method 415 should be cited for organic carbon, not 236. All references should be rechecked. The latest editions of the references (SW-846 3rd edition and Standard Methods 16th edition) should be used. Specific methods should be cited, rather than items 200-289 for metals analysis.

A quality assurance/quality control program for EDI's laboratory is needed. Items such as the use of spikes, duplicate samples and standards should be included. The plan does indicate that lab notebooks are kept, and discusses some of the items to be included. This additional information is needed to assure that the careful practices that were evidenced in the field are maintained through the sample preparation and analysis steps.

In summary, both the written plan and the field work were acceptable in most areas. The plan needs to be updated to include details on purging and lab QA/QC. It should also be changed to better reflect the field measurement information, measuring both pH and specific conductance at the time of sampling, as well as the method and schedule of meter calibration. More information on the methods used to filter the samples, and to decontaminate this equipment should be included. Clarification on the time elapsed between purging and sampling should be made, and a note on the care needed for volatile organic sampling should be added. Finally, Table 13 should include detection limits, and the method references need to be checked and updated to reflect newer editions of the references, where applicable.

This concludes the sampling and analysis portion of the CME inspection. A final summary document (including a hydrogeo evaluation, statistical review, ground water contours, etc.) will be forthcoming.

Please call if you have any questions regarding this review.

cc Mr. D. Slayton
Mr. J. Bohunsky
Mr. D. Drake
C&E File
CME Reports ✓
Ms. M. Sabadaszka, U.S. EPA-Region V

1988 CME
QUANEX Corp.
David Slayton

Hydrogeology
Groundwater Monitoring
Groundwater Quality

Hydrogeology

The facility rests on glacial drift deposits that are typical in Michigan. The Quanex facility in South Lyons is in an interlobate area, northwest of the Erie glacial lobe. The north-northeast part of the facility has 15-30 feet of outwash sand and gravel deposits resting on interbedded silt, sand, and clay. In the southern part of the site, only outwash deposits are encountered, which are at least 70 feet deep. The January 1986 Part B application for Quanex by EDI Engienering & Science has a good discussion of site geology. The attached cross-sections in appendix A come from the Part B application, and are used in this report because they are of excellent quality.

Groundwater elevation measurements have consistently shown mounding of the water table under the two impoundments. There are multiple well clusters on all four sides of the impoundments. The cross-sections in Appendix A include vertical groundwater gradients, showing the obvious mounding and downward head at the impoundments. The mounding dissipates rapidly, particularly at the south end where the thick outwash deposits are. In the northern part of the impoundments, the outwash is thinner on top of the silt/sand/clay unit, and the mounding does not dissipate as fast. Without the influence of the impoundments, the flow direction of shallow groundwater would likely be northeast to southwest. Appendix B is a groundwater contour map from the Quanex 1987 annual report, clearly showing the mounding around the impoundments, and groundwater flow radially outward from the impoundments. Some groundwater will likely discharge to the northwest into the adjacent swamp, while the discharge point for the most of the groundwater under the facility is Yerkes Drain on the south side of the plant.

The groundwater flow velocity as calculated in the 1987 annual report of 0.22 ft/day is a good estimate for areas outside of the groundwater "mound" at the impoundments. Immediately adjacent to the impoundments, the flow will be much faster due to the steep gradient. Using the same permeability (9.4×10^{-3} cm/sec) and porosity (.35) as the annual report calculations, the groundwater flow velocity next to the lagoons is 4.5 feet/day using a gradient of 0.06.

Groundwater Monitoring History

Quanex started RCRA interim status groundwater monitoring under 40 CFR 265, Subpart F in late 1983. The four quarterly background sampling events were done in 12/83, 3/84, 6/84, and 9/84. Subsequent sampling in 1/85, 4/85 and 7/85 and statistical analyses indicated exceedances. A

groundwater assessment plan by Keck Consulting was implemented that included six steps.

In step 2, wells 1, 2, 3, and 4 were analyzed for volatile organics, water quality parameters, and selected groundwater protection parameters. Step 2 included a resampling of the wells for methylene chloride which was detected in Step 1. In April 1986, Quanex proposed through their consultant, EDI Engineering & Science to modify the assessment plan to include recent information developed for the Part B application. The April 1986 plan was revised in July 1986, and approved in October 1986. Since then, quarterly sampling has occurred, and Quanex has been submitting quarterly and annual reports. The constituents of concern have been identified as arsenic and 1,1-dichloroethane.

Due to expansion of the Quanex wastewater treatment plant, three monitoring wells have been plugged and abandoned (see 3/18/88 letter to D. Slayton from EDI). Monitor wells 3, 14A and 14B will be removed from service. Monitor wells 6A and 15A will be sampled as substitutes for the abandoned wells.

Quanex has an approved closure plan for the two surface impoundments, but has not started closure yet. The impoundments are to be no longer used by November 8, 1988. The wastewater treatment plant is being expanded to replace the impoundments.

During closure, excavation in the southwest corner of the west lagoon should proceed until the fill material is removed. Soil boring SB-22 noted "wood, black, oily, tar odor" from 9.5-15 feet deep. This material must be removed at closure.

Groundwater Quality

Comparison of laboratory data between DNR and EDI was done for six samples. Appendix C contains a table of comparison and a copy of the analytical results. For the mutual parameters, there is good correlation except for barium and field pH. For barium, the DNR results are consistently much lower than EDI data. The reason is unknown. For field pH, the DNR data is again consistently lower. The probable reasons is use of different meters and calibration standards. For the two parameters of concern, 1,1-dichloroethane and arsenic, there is very good correlation.

Appendix D contains piper diagrams, stiff diagrams, and pie charts. Two wells show slight impacts based on this data. Well 13A has higher total dissolved solids and bicarbonate (HCO_3) compared to other wells. Well 14A shows the most impact based on the graphs. This well has less sulfate (SO_4) and more chloride (Cl) relative to other wells. Both wells are downgradient of the impoundments, but well 14A could also be affected by the wastewater treatment plant. Well 14A is to be removed for expansion of the WWTP.

1,1-Dichloroethane was detected at wells 11-B (DNR, EDI) and 14A (EDI), at 1.2 to 4.0 ppb. Arsenic was detected at wells 11A, 11B, 13B, and 14A by both DNR and EDI from 2.1 to 6.6 ppb. EDI also detected arsenic at

11-D and 12-B, which DNR did not sample. Sulfate concentrations are high, upgradient and downgradient. Manganese values exceed secondary drinking water standards, and iron values are high. Both parameters are elevated in the upgradient well #1, although DNR results show higher iron in wells 13B and 14A. Historically, 1,1-dichloroethane has been detected in wells 11A, 11B, and 14A, although not always at "statistically significant" levels based on the groundwater assessment plan statistical procedure.

In summary, the impacts on groundwater quality have been minor from the impoundments. The parameters in question are 1,1-dichloroethane (low ppb range) and arsenic (low ppb range). There has been no proposed remediation for either parameter, although the company contends that the arsenic is naturally occurring from deeper in the aquifer.

APPENDIX A

CROSS-SECTIONS

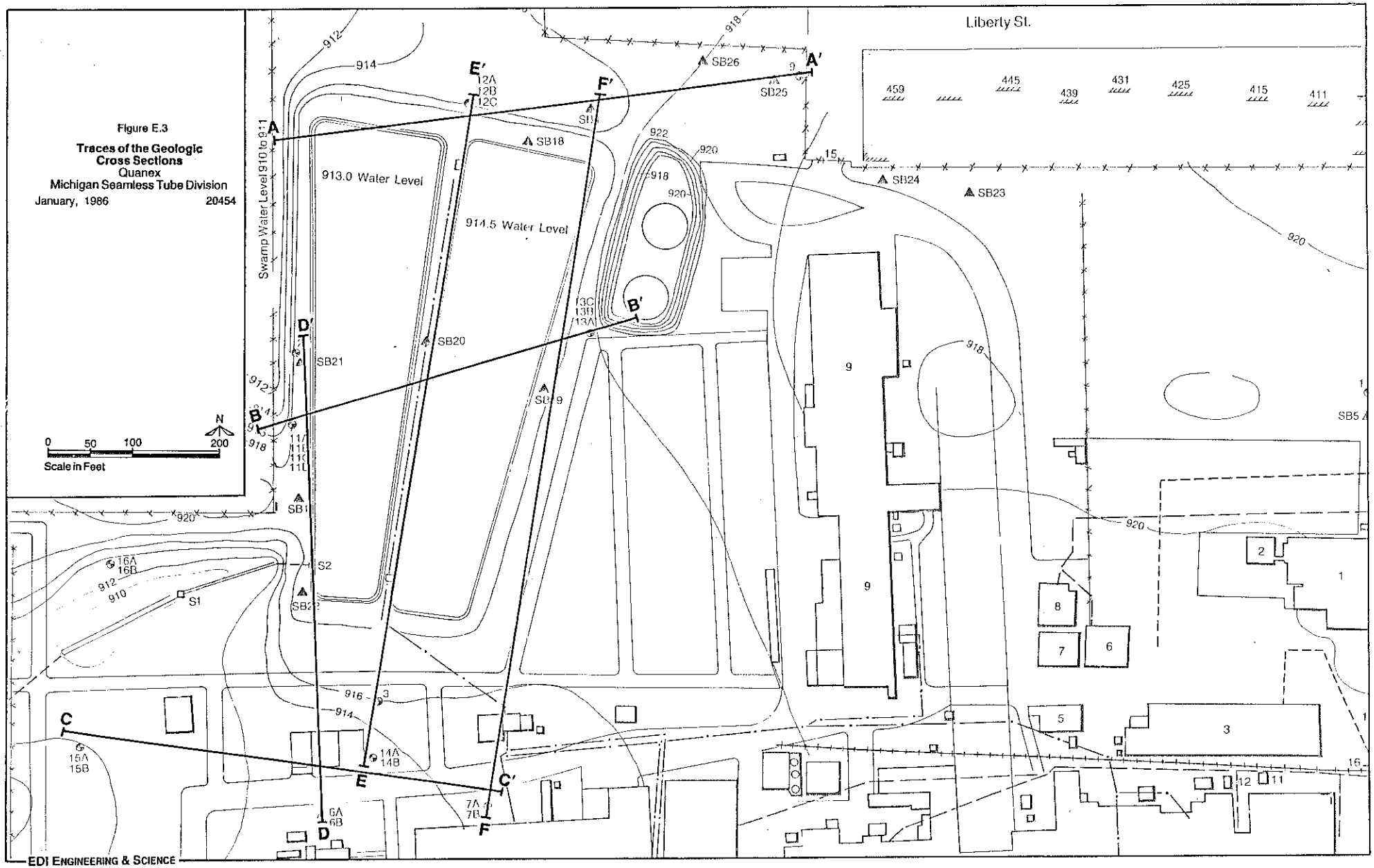


Figure E.3
Traces of the Geologic Cross Sections
Quanex
Michigan Seamless Tube Division
January, 1986
20454
Liberty St.
Swamp Water Level 910 to 911
913.0 Water Level
914.5 Water Level
SB1
SB2
SB3
SB4
SB5
SB18
SB20
SB21
SB23
SB24
SB25
SB26
S1
S2
A
A'
B
B'
C
C'
D
D'
E
E'
F
F'
459
445
439
431
425
415
411
0 50 100 200
Scale in Feet
N
EDI ENGINEERING & SCIENCE

Gravel
Sand
Silt
Clay
Clay, Sand and Gravel or Rock Fragments
Clay with Sand
Clay with Silt
Silt with Sand and Gravel
Silt with Sand
Sand with Gravel
Peat
Clay, Silt and Sand
Silt with Sand and Gravel
Wood and Metal Fill

Well Screen and Water

911.6 Level Recorded 10-23-85

Division Between Outwash and Interbedded Silt, Clay and Sand

Contour of Piezometric Surface

Water Table
Piezometric Contour Interval: 1 foot

Horizontal Scale 1'' = 100'
Vertical Scale 1'' = 25'
Vertical Exageration 4:1

Figure E.4
Key to Geologic Cross Section
Quanex
Michigan Seamless Tube Division
December, 1985 20454

A

A′

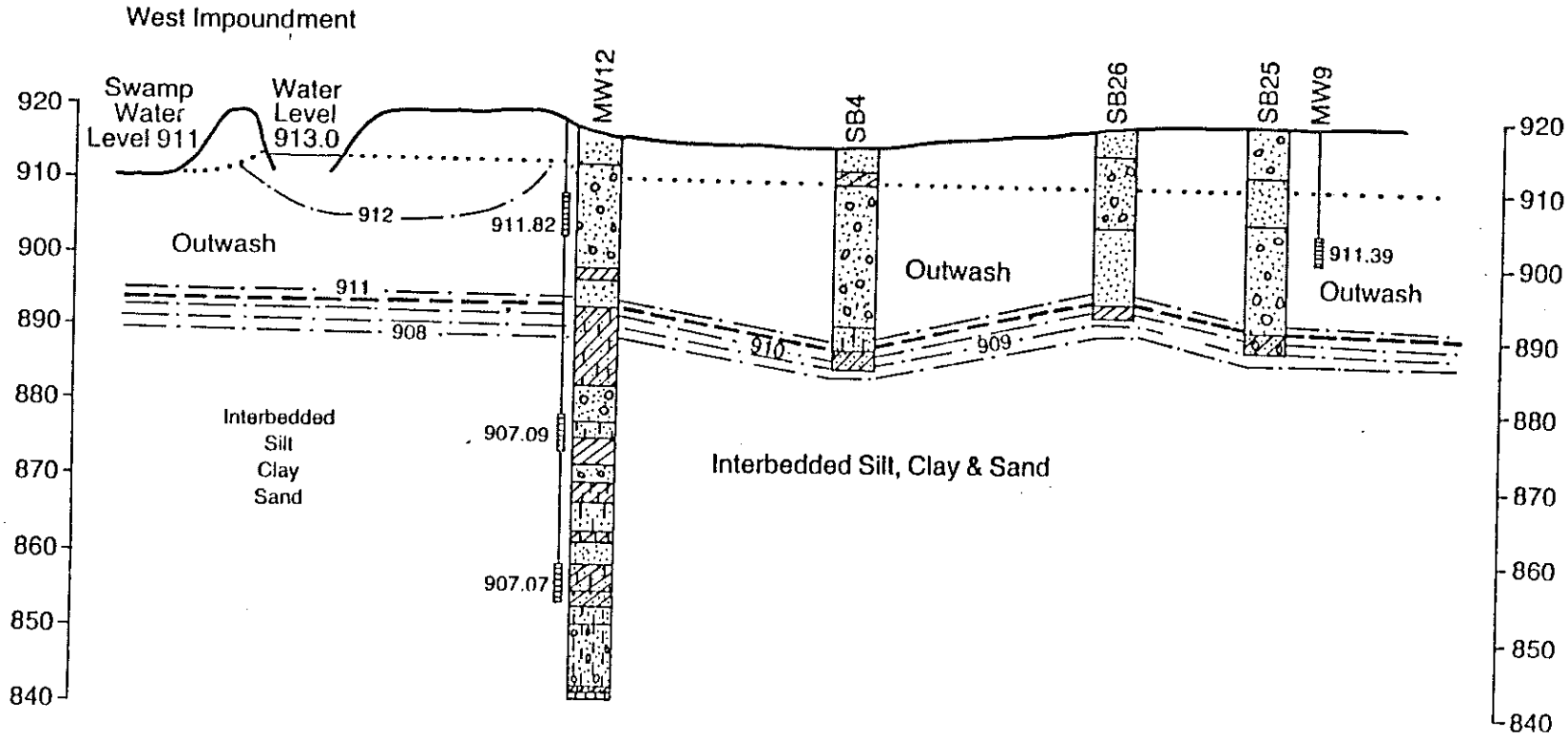


Figure E.5

Geologic Cross Section A-A′

Quanex
Michigan Seamless Tube Division
December, 1985 20454

B

B′

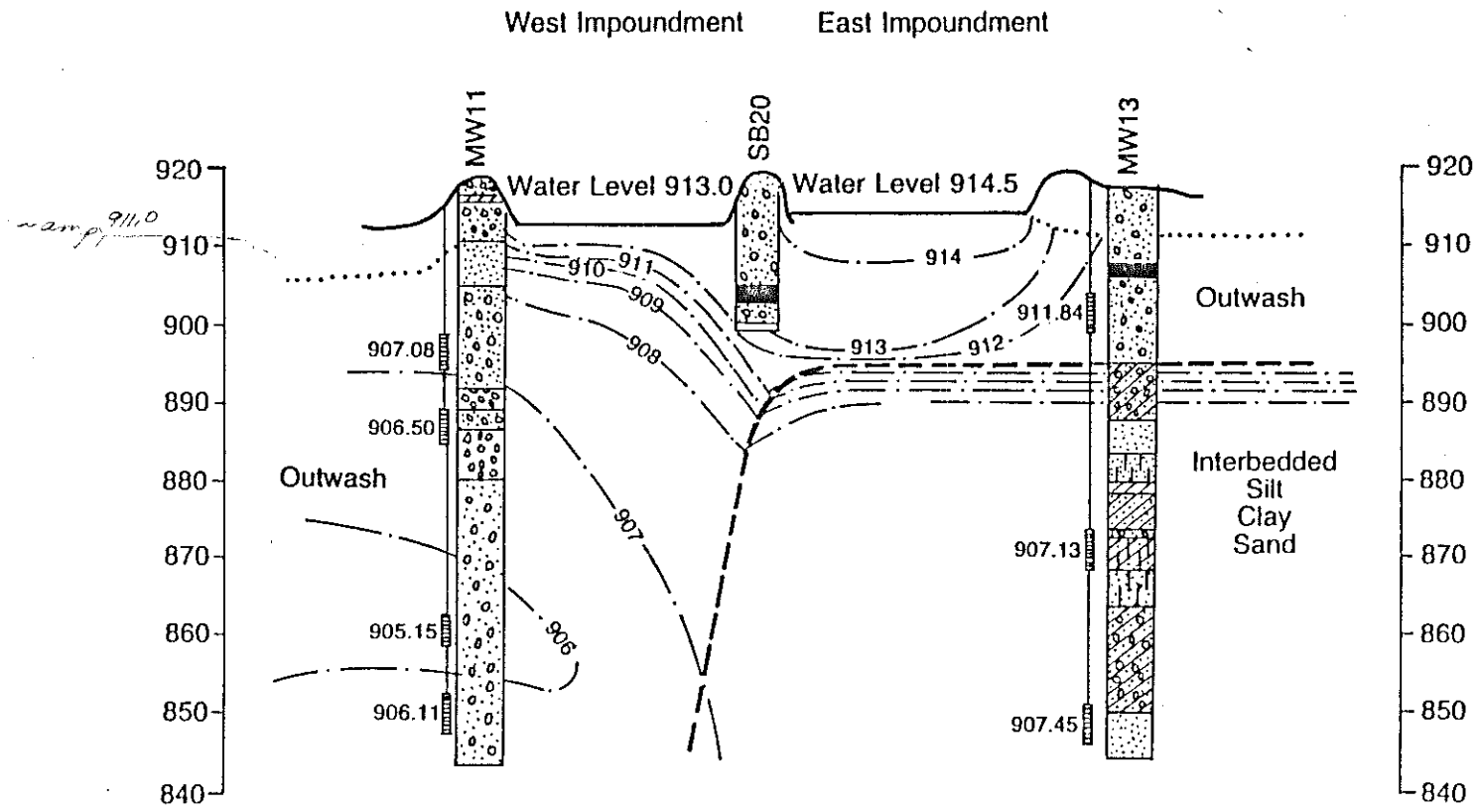


Figure E.6

Geologic Cross Section B-B′

Quanex
Michigan Seamless Tube Division

December, 1985 20454

C

C'

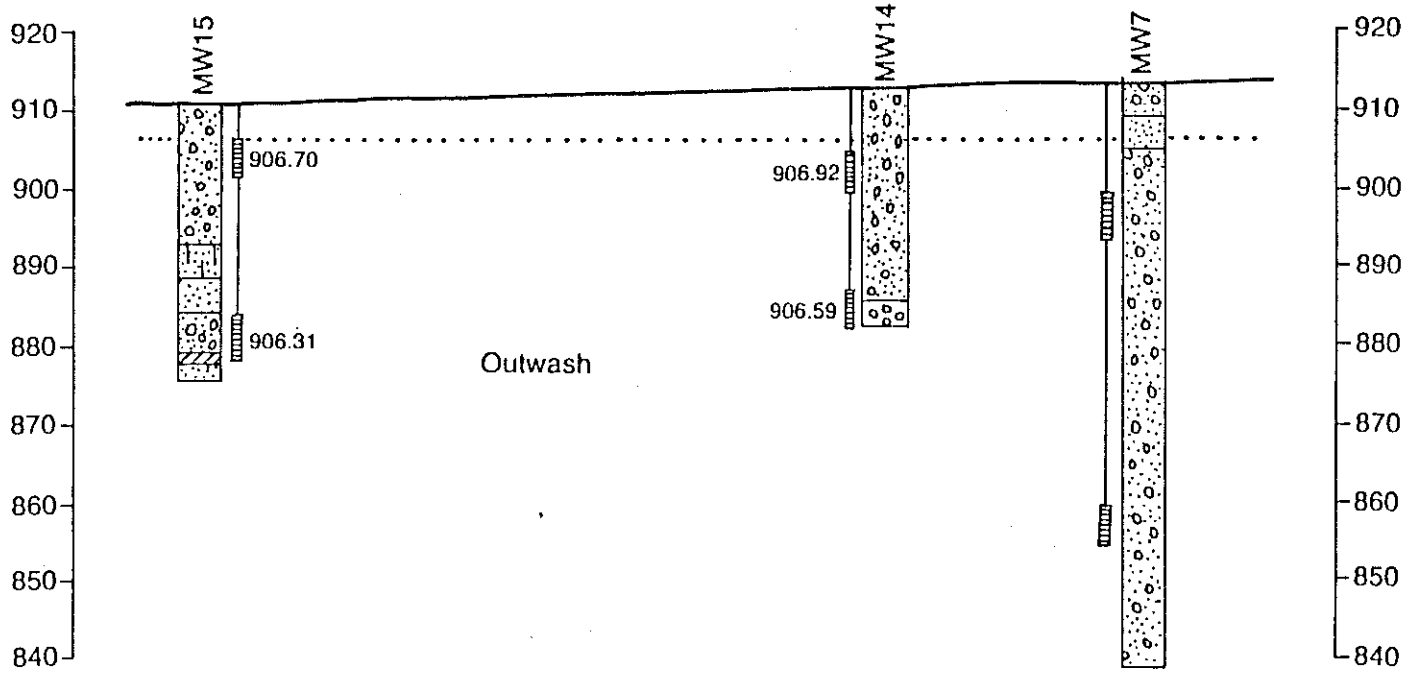


Figure E.7

Geologic Cross Section C-C'

Quanex
Michigan Seamless Tube Division

December, 1985 20454

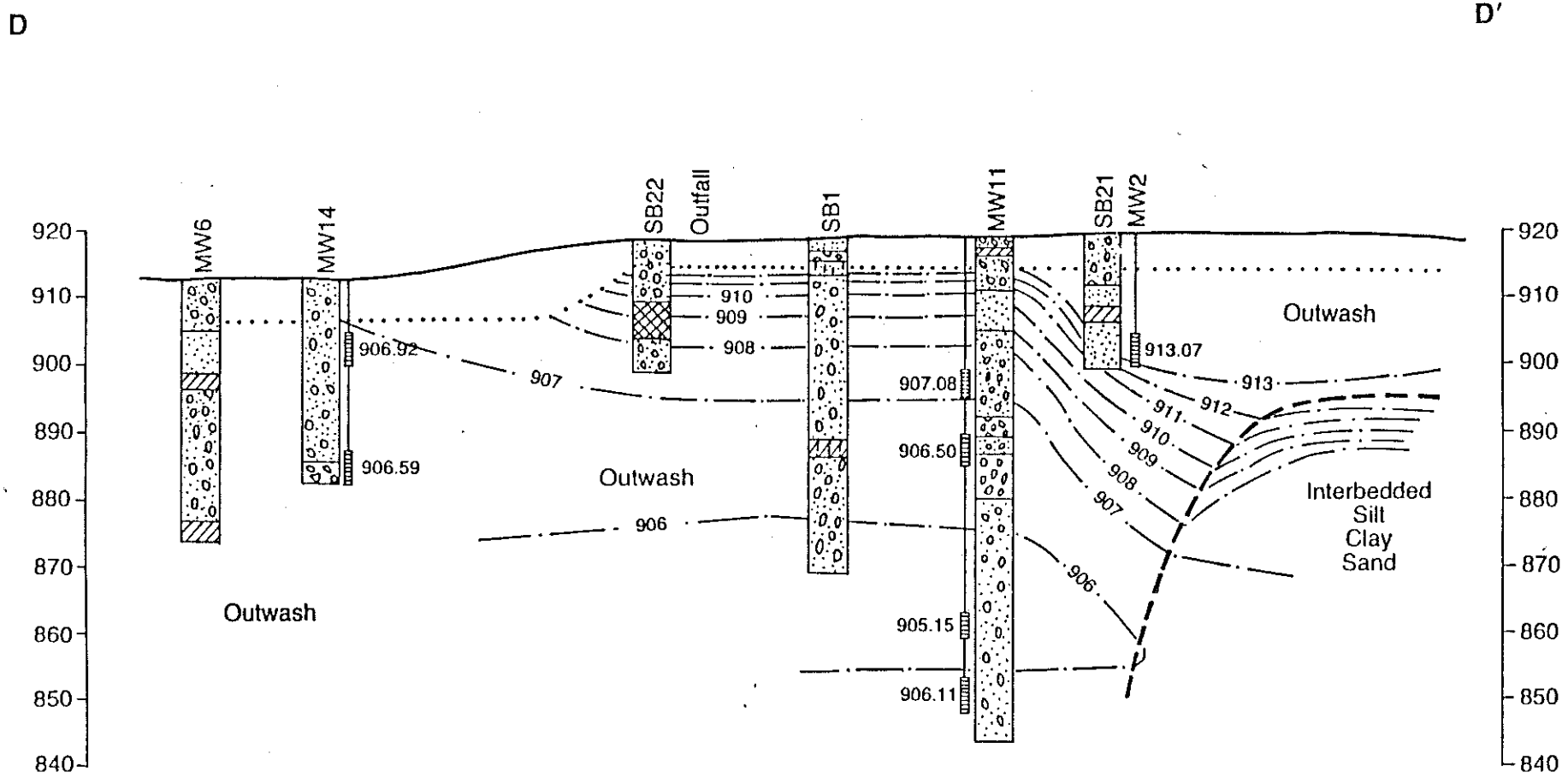


Figure E.8

Geologic Cross Section D-D'

Quanex
Michigan Seamless Tube Division

December, 1985 20454

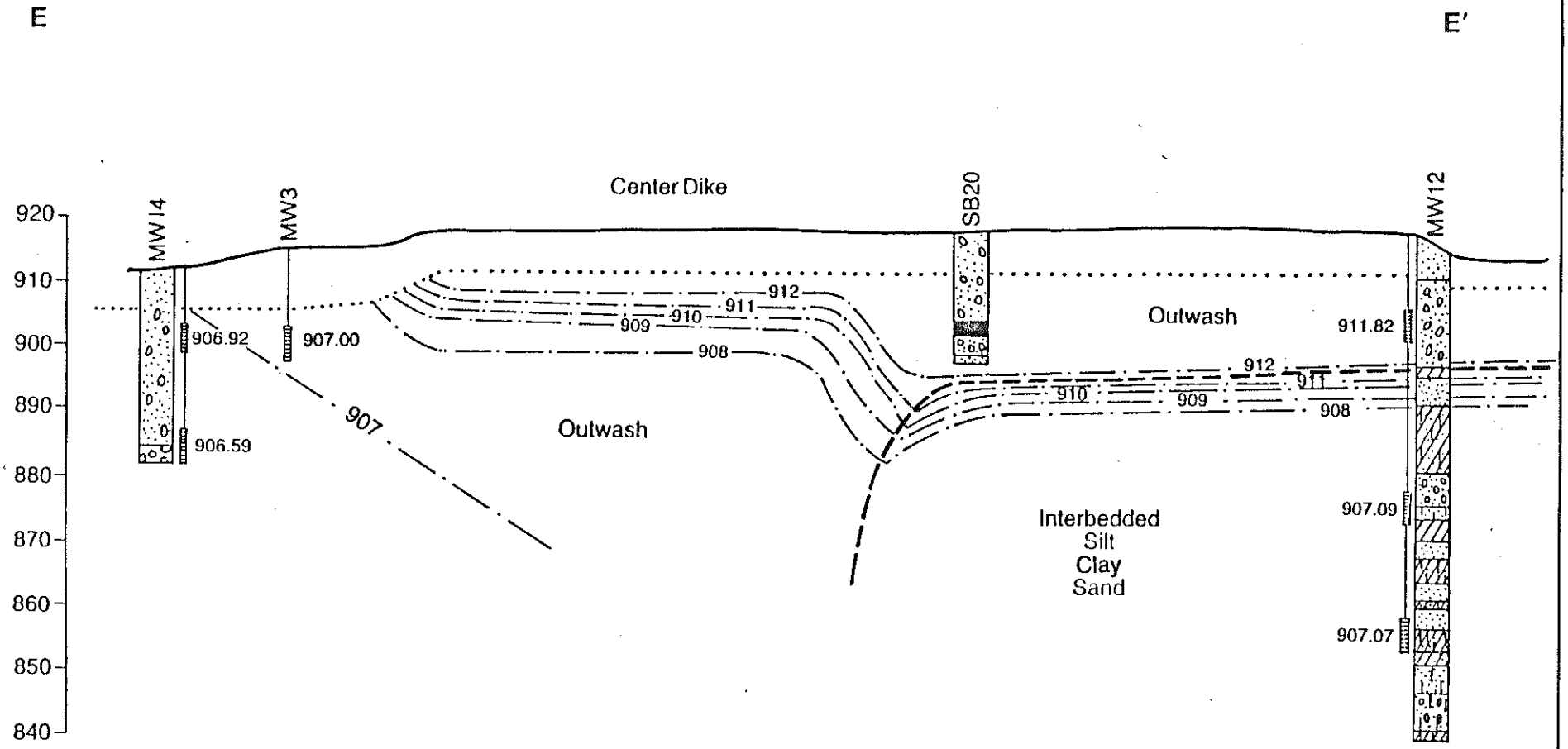


Figure E.9

Geologic Cross Section E-E'

Quanex
Michigan Seamless Tube Division

December, 1985 20454

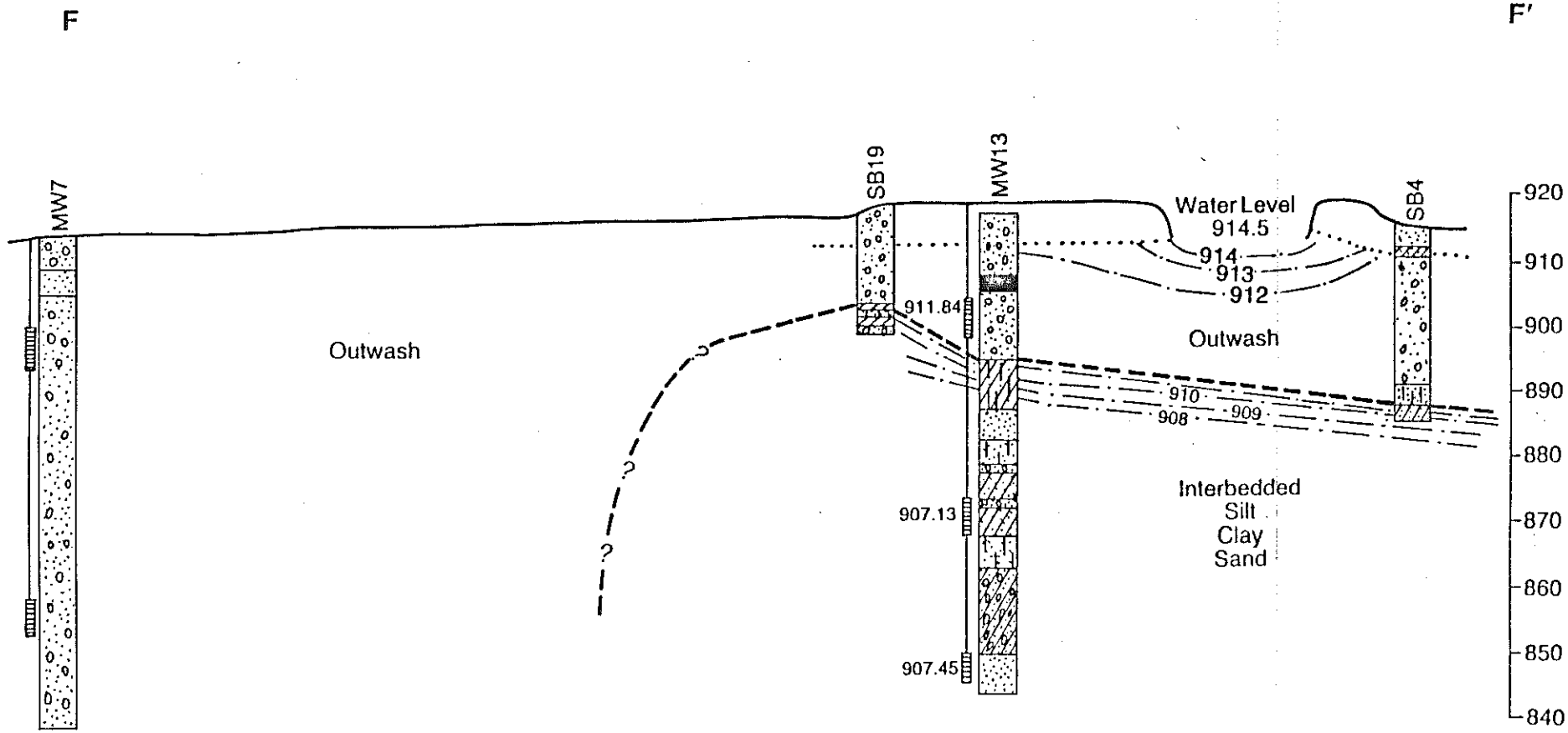


Figure E.10
Geologic Cross Section F-F'
Quanex
Michigan Seamless Tube Division
December, 1985 20454

APPENDIX B

GROUNDWATER CONTOUR MAP

ATTACHMENT A
QUANEX CORPORATION, Michigan Seamless Tube Division
Updated: 11/12/87

Water level data

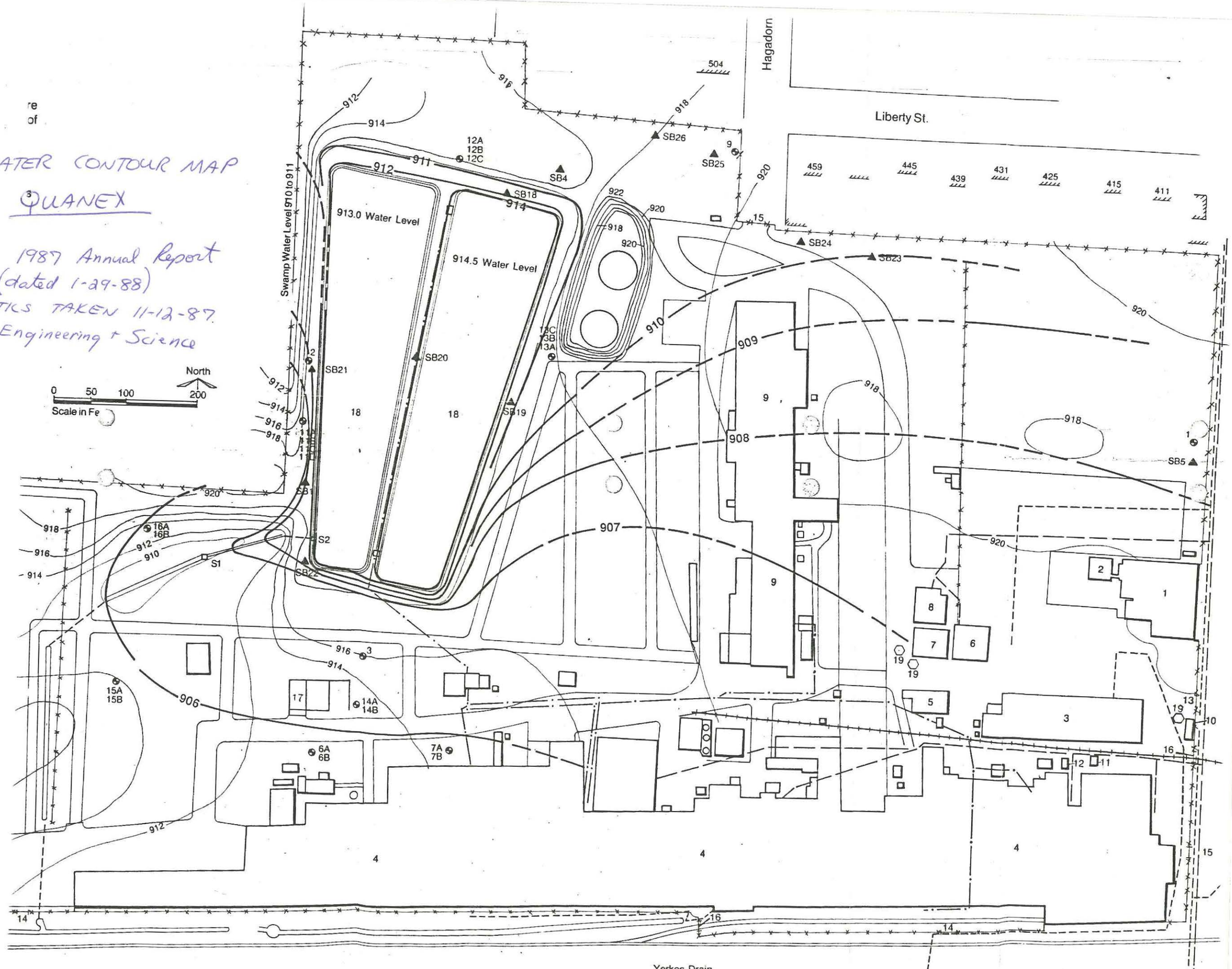
WELL	T.O.C.	3/11/87 S.W.L.	5/18/87 S.W.L.	8/18/87 S.W.L.	from TOC	11/12/87 S.W.L.	elev. ground	elev. screen
1	920.62	908.71	908.77	908.31	12.39	908.23	918.3	901.0
2	921.42	broken	broken	broken	NM		918.4	899.6
3	915.02	906.53	906.46	906.00	8.92	906.10	911.7	898.9
4	907.94	903.81	903.45	902.79	4.47	903.46	904.7	895.2
5	909.25	904.62	904.00	903.44	4.76	904.49	907.2	895.5
6 A	914.03	906.20	905.99	905.75	8.24	905.79	911.7	898.3
6 B	913.46	905.84	905.52	905.25	8.04	905.42	911.8	876.8
7 A	914.94	906.39	906.17	905.85	8.98	905.95	914.3	895.2
7 B	915.63	905.91	905.57	905.28	10.11	905.52	914.3	854.9
8	910.86	NM	NM	NM	NM	NM	900.5	NM
9	921.48	910.55	910.84	910.29	11.34	910.14	920.5	900.5
11 A	921.00	906.58	906.52	906.04	14.86	906.14	918.5	894.2
11 B	921.05	906.08	905.97	905.44	15.41	905.64	918.5	885.0
11 C	921.97	905.77	905.44	905.09	16.69	905.28	918.5	859.3
11 D	920.77	905.76	905.42	905.05	15.5	905.27	918.2	848.3
12 A	918.12	910.92	911.75	910.59	7.59	910.53	916.2	902.3
12 B	918.15	906.59	906.50	906.03	12.02	906.13	916.1	874.7
12 C	918.38	906.64	906.44	905.92	12.16	906.22	915.9	854.5
13 A	920.52	910.88	911.65	910.68	9.96	910.56	917.5	899.0
13 B	920.31	906.60	906.53	906.01	13.61	906.70	917.6	868.3
13 C	920.12	907.13	906.74	906.31	13.45	906.67	917.7	845.9
14 A	914.02	906.44	906.36	905.94	7.84	906.18	911.4	899.3
14 B	914.25	906.33	906.19	905.80	8.34	905.91	911.5	882.4
15 A	913.37	906.25	906.05	905.84	7.45	905.92	910.6	901.6
15 B	913.30	905.96	905.71	905.43	7.7	905.59	910.6	878.8
16 A	915.32	906.54	906.44	906.04	9.22	906.10	912.8	900.9
16 B	915.65	906.14	905.93	905.65	9.86	905.79	913.2	884.0

re
of

GROUNDWATER CONTOUR MAP

QUANEX

FROM 1987 Annual Report
(dated 1-29-88)
STATICS TAKEN 11-12-87
EDI Engineering + Science



APPENDIX C

LAB COMPARISON OF DATA

ATTACHMENT B

ANALYTICAL RESULTS FROM FIRST QUARTERLY SAMPLING IN 1988

QUANEX CORPORATION, MICHIGAN SEAMLESS TUBE DIVISION

SAMPLED ON FEBRUARY 10, 1988

(Metal analyses for monitoring well 14A and 16A sampled on 2/17/88 due to defective filter during initial sampling)

	Units	Detection Limit	Well 1	Well 11-A	Well 11-B	M.W. 11-D	M.W. 12-A	M.W. 12-B
1,1-Dichloroethane	ug/l	1	<1	**	3.5	<1	<1	<1
Arsenic	ug/l	2.0	<2.0	2.1	4.0	6.0	<2.0	8.0
Barium	mg/l	0.1	0.31	0.47	0.32	0.34	0.15	0.27
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	ug/l	2.0	2.4	<2.0	<2.0	<2.0	10	<2.0
Silver	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
*Conductivity (Field)	umhos/cm	5	1,745	1,758	1,676	859	1,212	1,550
pH (field)	standard	NA	7.32	7.57	7.42	7.43	7.66	7.41

	Units	Detection Limit	M.W. 13-A	M.W. 13-B	M.W. 14-A	M.W. 16-A	Field Blank	Trip Blank
1,1-Dichloroethane	ug/l	1	<1	<1	1.2	<1	<1	<1
Arsenic	ug/l	2.0	<2.0	5.5	6.6	<2.0	<2.0	<2.0
Barium	mg/l	0.1	0.57	0.26	0.26	0.32	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	ug/l	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
*Conductivity (Field)	umhos/cm	5	2,161	1,799	1,714	1,638	NA	NA
pH (field)	standard	NA	7.15	7.25	7.28	7.37	NA	NA

< - Not detected at the indicated detection limit.

NA - Not analyzed.

* - Temperature adjusted.

** - Sample vial broken upon log-in.

MICHIGAN DNR

R-1016 4/70

FEB 10, 1988

Quanex Corp., South Lyons MID 082 767 591

Parameter	mg/l unless noted	MW1	MW11A	MW11B	MW13A	MW13B	MW14A	Field Blank
Alkalinity		103	136	120	308	142	350	<5.0
Carbonate Alk		<5	<5	<5	<5	<5	<5	<5
Bicarbonate Alk		103	136	120	308	142	350	<5
Chloride		47	74	78	44	50	170	<1.0
Arsenic		<0.002	0.0034	0.004	<0.002	0.004	0.00666	<0.002
Barium		0.034	0.072	0.022	0.125	0.026	0.118	<0.01
Calcium		365	374	334	497	391	306	<1
Cadmium		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chromium		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	dissolved	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron		3.3	5.95	3.1	3.5	6.35	12.5	<0.1
Potassium		7.6	10.6	5.14	2.45	5.2	3.4	<0.1
Magnesium		32.2	34.2	37.5	78	53	19.7	<1
Manganese		0.995	0.885	0.45	0.9	0.36	0.17	<0.02
Sodium		84.1	61.3	61.9	61.1	54.6	73	<1
Nickel		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc		0.97	<0.05	<0.05	<0.05	<0.05	0.48	<0.05
Conductivity (field)	umhos/cm	1880	1720	1680	2200	1645	1660	—
pH (field)	su	6.5	6.8	6.8	6.6	6.8	6.6	—
Sulfate		1070	910	818	1120	1050	330	<2.0
	ug/l							
1,1 Dichloroethane		<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0
Others in Scan 1 *		<detection	<detection	<detection	<detection	<detection	<detection	<detection
Toluene		<1.0	<1.0	1.1 UC	<1.0	<1.0	<1.0	<1.0
Others in Scan 2 *		<detection	<detection	<detection	<detection	<detection	<detection	<detection

* All volatile organic scan data coded HT
HT - The recommended maximum laboratory holding time was exceeded before analysis.
See attached list for organic scan parameters and detection limits.

MDNR Samples from 2/10/88 split sampling with Quanex. Samples analyzed at DNR lab.

Comparison of DNR and Company (EDI) Lab Results
Quanex Corp - Feb. 10, 1988

		1,1 DCE	As	Ba	Cd	Cu	Cr	Pb	pH	Conduct.
		ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU	umhos/cm
MW-1	DNR	K1.0	K2.0	0.034	K0.02	K0.02	K0.05	K0.05	6.50	1,880
	EDI	K1.0	K2.0	0.310	K0.01	K0.01	K0.05	K0.05	7.32	1,745
MW-11A	DNR	K1.0	3.4	0.072	K0.02	K0.02	K0.05	K0.05	6.80	1,720
	EDI	*	2.1	0.470	K0.01	K0.01	K0.05	K0.05	7.57	1,758
MW-11B	DNR	4.0	4.0	0.022	K0.02	K0.02	K0.05	K0.05	6.80	1,680
	EDI	3.5	4.0	0.320	K0.01	K0.01	K0.05	K0.05	7.42	1,676
MW-13A	DNR	K1.0	K2.0	0.125	K0.02	K0.02	K0.05	K0.05	6.60	2,200
	EDI	K1.0	K2.0	0.570	K0.01	K0.01	K0.05	K0.05	7.15	2,161
MW-13B	DNR	K1.0	4.0	0.026	K0.02	K0.02	K0.05	K0.05	6.80	1,645
	EDI	K1.0	5.5	0.260	K0.01	K0.01	K0.05	K0.05	7.25	1,799
MW-14A	DNR	K1.0	6.6	0.118	K0.02	K0.02	K0.05	K0.05	6.60	1,660
	EDI	1.2	6.6	0.260	K0.01	K0.01	K0.05	K0.05	7.28	1,714

K - less than

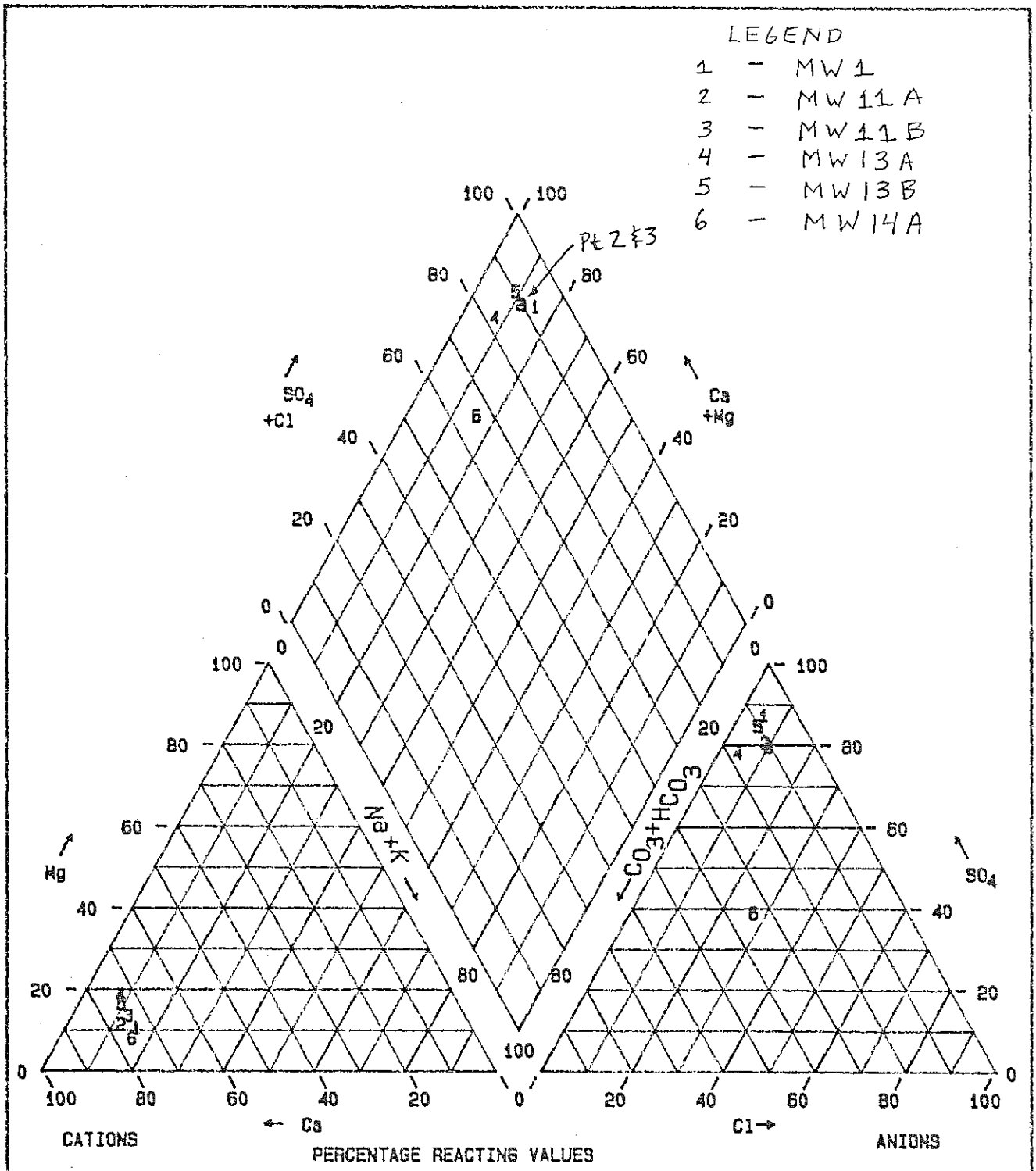
* - sample vial broken upon log-in

APPENDIX D

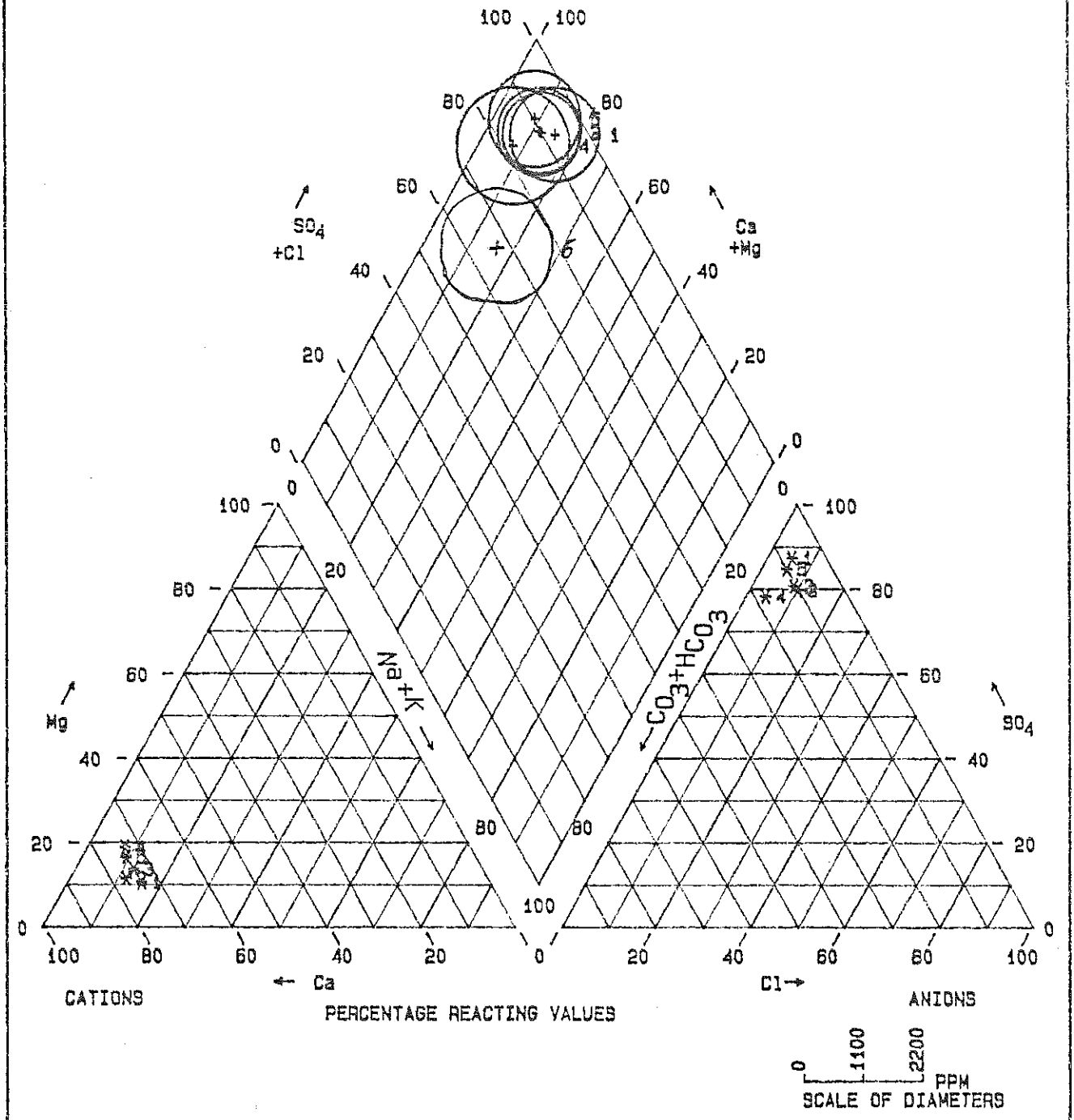
GRAPHICAL ANALYSIS

OF

GROUNDWATER DATA

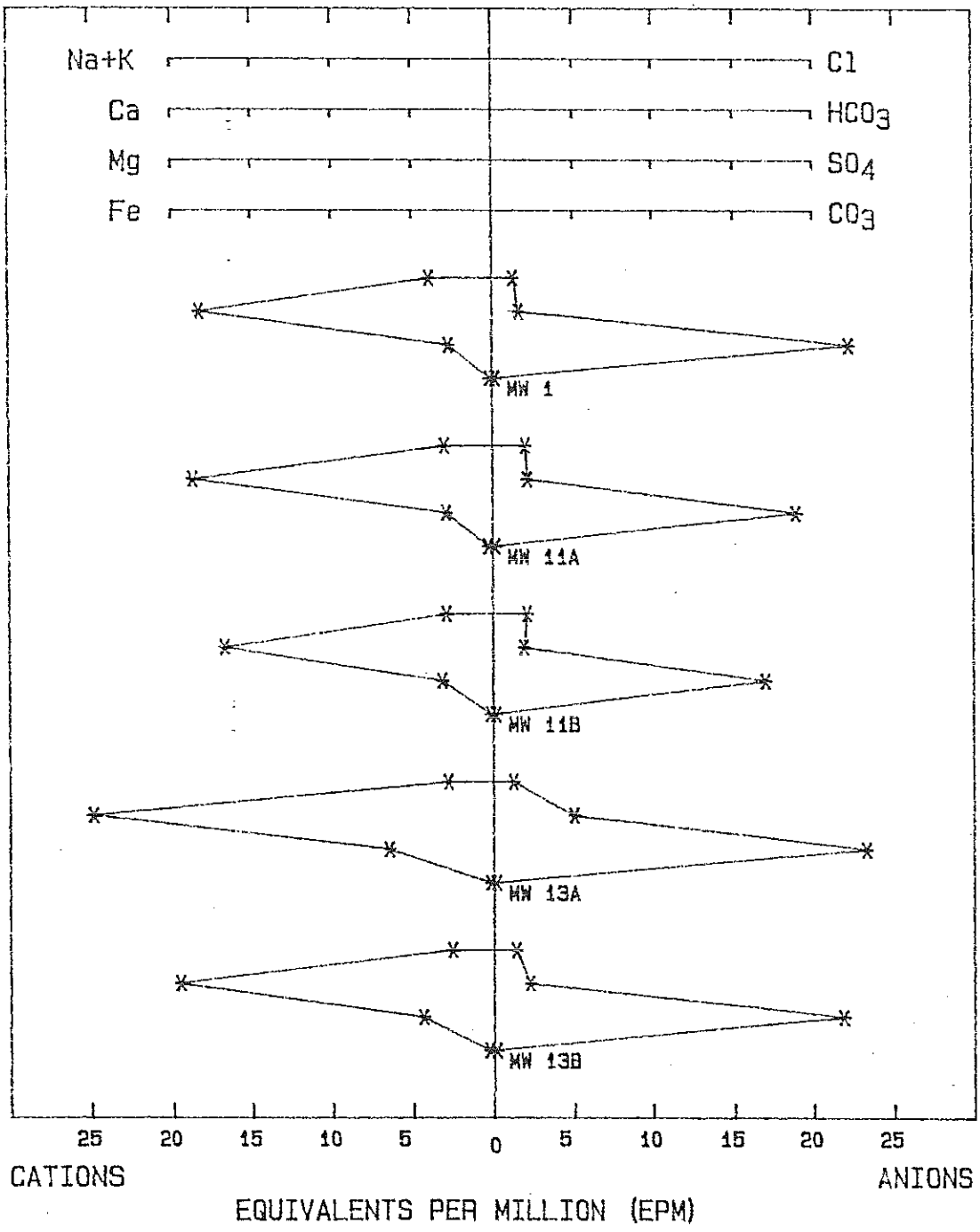


PROJECT: QUANEX CORP. FILE: MID 082 767 591 LOCATION: SOUTH LYONS MI.	PIPER TRILINEAR DIAGRAM
MICHIGAN DEPT. OF NATURAL RESOURCES	FIGURE:



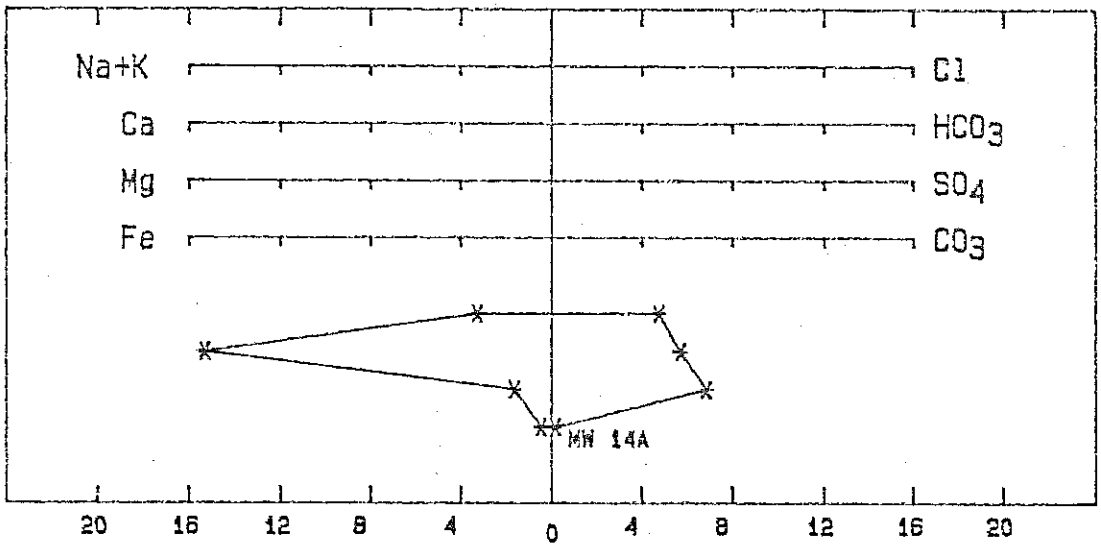
PROJECT: QUANEX CORP FILE: MID 082 767 591 LOCATION: SOUTH LYONS	PIPER TRILINEAR DIAGRAM
MICHIGAN DEPT. OF NATURAL RESOURCES	FIGURE:

STIFF GRAPH



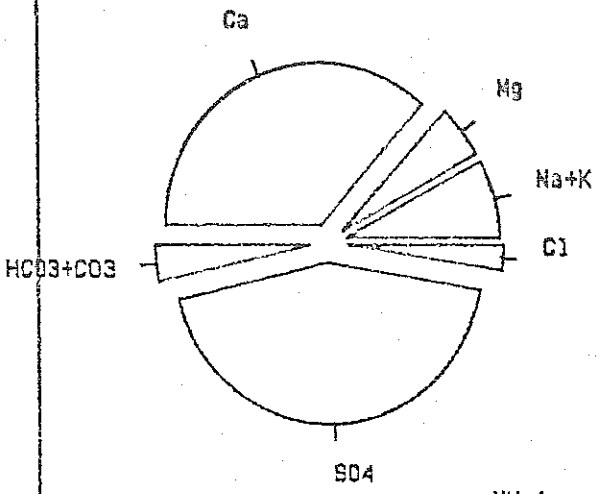
PROJECT: QUANEX CORP FILE: MID 082 767 591 LOCATION: SOUTH LYONS	
MICHIGAN DEPT. OF NATURAL RESOURCES	FIGURE:

STIFF GRAPH

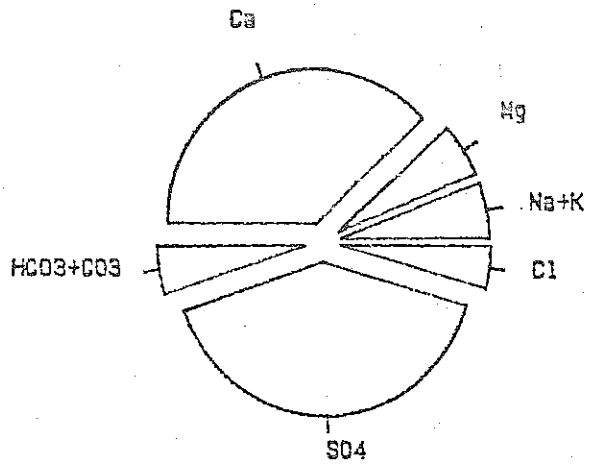


EQUIVALENTS PER MILLION (EPM)

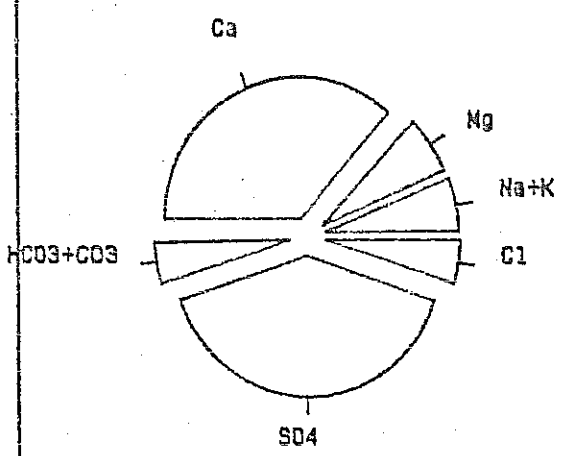
PROJECT: QUANEX CORP FILE: MID 082 767 591 LOCATION: SOUTH LYONS	
MICHIGAN DEPT. OF NATURAL RESOURCES	FIGURE:



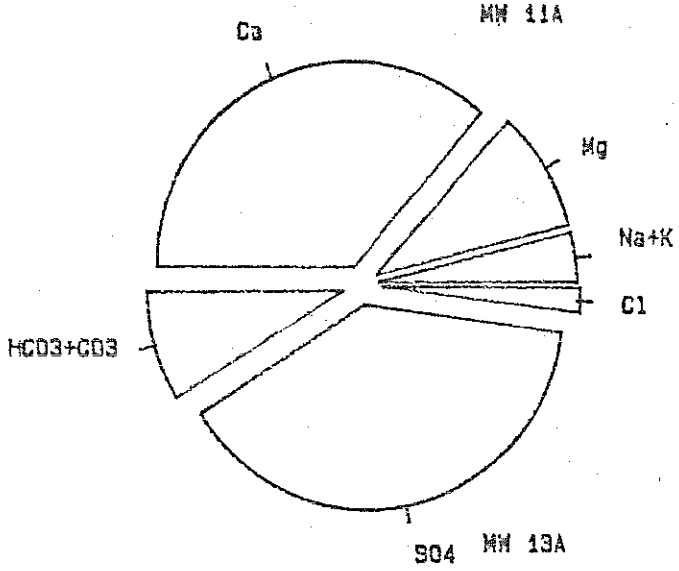
MW 1



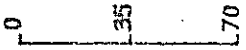
MW 11A



MW 11B

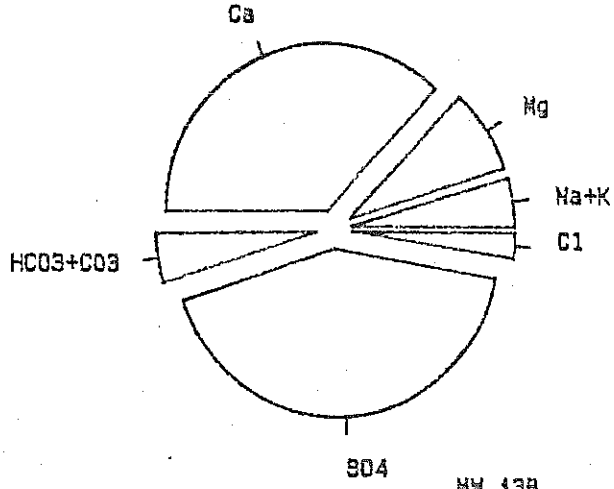


MW 13A



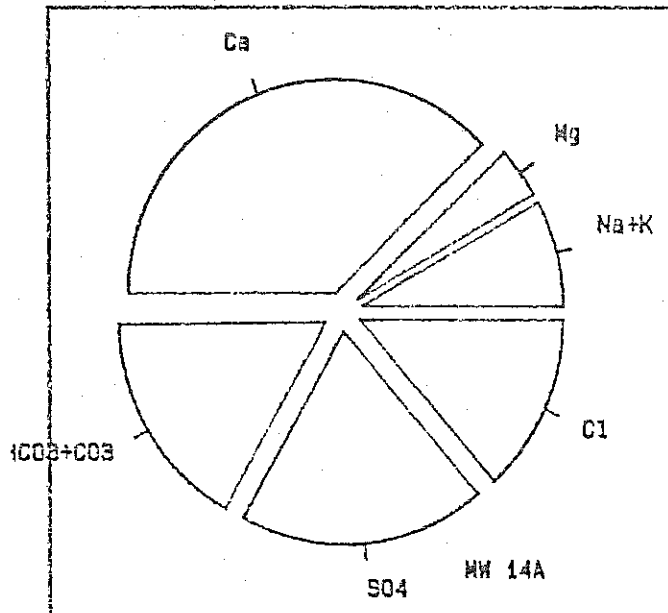
SCALE OF RADII
(TOTAL OF EQUIVALENTS
PER MILLION)

NOTE ERROR (IF ANY) IN CATION/ANION
BALANCE HAS BEEN REMOVED



MW 13B

PROJECT: QUANEX CORP FILE: MID 082 767 591 LOCATION: SOUTH LYONS	PIE DIAGRAMS SHOWING WATER QUALITY
MICHIGAN DEPT. OF NATURAL RESOURCES	FIGURE:



0 20 40

SCALE OF RADII
(TOTAL OF EQUIVALENTS
PER MILLION)

NOTE ERROR (IF ANY) IN CATION/ANION
BALANCE HAS BEEN REMOVED

PROJECT: QUANEX CORP FILE: MID 082 767 591 LOCATION: SOUTH LYONS	PIE DIAGRAMS SHOWING WATER QUALITY
MICHIGAN DEPT. OF NATURAL RESOURCES	FIGURE:

CHEMISTRY ANALYSIS

PROJECT: GUANEX CORP FILE: MID 082 767 591
LOCATION: SOUTH LYONS

WELL NO.: MW 1

CATIONS	PPM	EPM	% EPM
Ca	365.00	18.21	73.70
Mg	32.20	2.65	10.71
Na+K	91.70	3.85	15.59

ANIONS	PPM	EPM	% EPM
HCO3+CO3	108.00	1.85	7.29
SO4	1070.00	22.28	87.51
Cl	47.00	1.33	5.21

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 1.24 %
SODIUM ABSORPTION RATION (S.A.R.): 1.13

WELL NO.: MW 11A

CATIONS	PPM	EPM	% EPM
Ca	374.00	18.66	76.45
Mg	34.20	2.81	11.50
Na+K	71.90	2.94	12.03

ANIONS	PPM	EPM	% EPM
HCO3+CO3	141.00	2.40	10.23
SO4	910.00	18.95	80.87
Cl	74.00	2.09	8.91

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 0.45 %
SODIUM ABSORPTION RATION (S.A.R.): 0.8

CHEMISTRY ANALYSIS

PROJECT: QUANEX CORP FILE: MID 082 767 591
LOCATION: SOUTH LYONS

WELL NO.: MW 11D

CATIONS	PPM	EPM	% EPM
Ca	334.00	16.47	73.83
Mg	37.80	3.08	13.66
Na+K	67.04	2.82	12.51

ANIONS	PPM	EPM	% EPM
HCO3+CO3	125.00	2.13	9.99
SO4	818.00	17.03	79.72
Cl	78.00	2.20	10.30

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 3.00 %
SODIUM ABSORPTION RATION (S.A.R.): 0.86

WELL NO.: MW 13A

CATIONS	PPM	EPM	% EPM
Ca	497.00	24.80	73.08
Mg	78.00	6.41	18.90
Na+K	63.55	2.72	8.02

ANIONS	PPM	EPM	% EPM
HCO3+CO3	313.00	5.21	17.51
SO4	1120.00	23.32	78.32
Cl	44.00	1.24	4.17

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 6.72 %
SODIUM ABSORPTION RATION (S.A.R.): 0.67

MICHIGAN DEPT. OF NATURAL RESOURCES

CHEMISTRY ANALYSIS

PROJECT: QUANEX CORP FILE: MID 082 767 591
LOCATION: SOUTH LYONS

WELL NO.: MW 13R

CATIONS	PPM	EPM	% EPM
Ca	391.00	19.51	73.47
Mg	53.00	4.36	16.52
Na+K	59.80	2.51	9.51

ANIONS	PPM	EPM	% EPM
HCO3+CO3	147.00	2.49	9.68
SO4	1050.00	21.86	84.85
Cl	50.00	1.41	5.47

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 1.60 %
SODIUM ABSORPTION RATION (S.A.R.): 0.69

MICHIGAN DEPT. OF NATURAL RESOURCES

CHEMISTRY ANALYSIS

PROJECT: QUANEX CORP FILE: MID 062 767 591
LOCATION: SOUTH LYONS

WELL NO.: MW 14A

CATIONS	PPM	EPM	% EPM
Ca	306.00	15.27	75.77
Mg	19.70	1.62	8.04
Na+K	76.40	3.26	16.19

ANIONS	PPM	EPM	% EPM
HCO3+CO3	355.00	5.90	33.60
SO4	330.00	6.87	39.11
Cl	170.00	4.79	27.29

TOTAL DISSOLVED SOLIDS:
ERROR IN CATION/ANION BALANCE: 7.94 %
SODIUM ABSORPTION RATION (S.A.R.): 1.09

MICHIGAN DEPT. OF NATURAL RESOURCES

Quaner
MD 082 007 591

Feb 23, 1988
Dave Stayton

Quaner · Don Comfort

RCRA PART 265

SUBPART F

ERTEC INSPECTION FORMS

Reference Documents

① Groundwater Quality Assmt Program Feb 1986 - April 1986 by ETAI

② Part B App Jan 1986

Neutralized pickle liquor sludge generated here has been de-listed effective 12/5/84 (June 5, 1984 Federal Register Vol. 49, No. 109). The water in the lagoons was not, and the company has submitted a delisting petition.

Groundwater monitoring continues quarterly under a groundwater assessment program (1,1 Dichloroethane and arsenic).

Company is going to close the two impoundments, and go to treatment in tanks.

APPENDIX - A

COMPLIANCE CHECKLIST FORMS

APPENDIX A-1

FACILITY INSPECTION FORM FOR COMPLIANCE WITH INTERIM STATUS STANDARDS COVERING GROUND-WATER MONITORING

Company Name: Quanex ; EPA I.D. Number: MID 082 767 591

Company Address: 400 McMunn, South Lyon, MI 48178 ; Inspector's Name: Dave Slayton

Company Contact/Official: Don Comfort ; Branch/Organization: _____

Title: Engineering Manager ; Date of Inspection: 9-23-88

Type of facility: (check appropriately)	Yes	No	Unknown	Waived
a) surface impoundment	✓		(2 S.I.)	
b) landfill		✓	- sludge deleted	
c) land treatment facility		✓		
d) disposal waste pile*		✓	- water still has, but a petition is in to delist	

Ground-Water Monitoring Program

1. Was the ground-water monitoring program reviewed prior to site visit? If "No",	✓			
a) Was the ground-water program reviewed at the facility prior to site inspection?	✓			
2. Has a ground-water monitoring program (capable of determining the facility's impact on the quality of groundwater in the uppermost aquifer underlying the facility) been implemented? 265.90(a)	✓			

*Listed separate from landfill for convenience of identification.

	Yes	No	Unknown
d) The potential for hazardous waste or hazardous waste constituents which may enter the uppermost aquifer to migrate to a water supply well or surface water, by evaluation of: 265.90(c)(2)			
1) Saturated zone characteristics, including:			
(a) Geologic materials?	____	____	
(b) Physical properties?	____	____	
(c) Rate of ground-water flow?	____	____	
2) Proximity of the facility to water supply wells or surface water?	____	____	

	Yes	No	Unknown	Waived
3. Has at least one monitoring well been installed in the uppermost aquifer hydraulically upgradient from the limit of the waste management area? 265.91(a)(1)	✓ (MW1)			
a) Are ground-water samples from the uppermost aquifer, representative of background ground-water quality and not affected by the facility (as ensured by proper well number, locations and depths?)	✓			
4. Have at least three monitoring wells been installed hydraulically downgradient at the limit of the waste handling or management area? 265.91(a)(2)	✓			
a) Do well number, locations and depths ensure prompt detection of any statistically significant amounts of HW or HW constituents that migrate from the waste management area to the uppermost aquifer?	✓			
5. Have the locations of the waste management areas been verified to conform with information in the ground-water program?	✓			
a) If the facility contains multiple waste management components, is each component adequately monitored?	N.A. – impounds are next together			
6. Do the numbers, locations, and depths of the ground-water monitoring wells agree with the data in the ground-water monitoring system program? If "No", explain discrepancies.	✓			
7. Well completion details. 265.91(c)				
a) Are wells properly cased?	✓			
b) Are wells screened (perforated) and packed where necessary to enable sampling at appropriate depths?	✓			
c) Are annular spaces properly sealed to prevent contamination of ground-water?	✓			

	Yes	No	Unknown
8. Has a ground-water sampling and analysis plan been developed? 265.92(a)	✓		
a) Has it been followed?	✓		
b) Is the plan kept at the facility?			
c) Does the plan include procedures and techniques for:			
1) Sample collection?			
2) Sample preservation?			
3) Sample shipment?			
4) Analytical procedures?			
5) Chain of custody control?			

Mike Liz Browne

April 1986 Sprint Plan contains the SAP plan

9. Are the required parameters in ground-water samples being tested quarterly for the first year? 265.92(b) and 265.92 (c)(1)	✓		
a) Are the ground-water samples analyzed for the following: started 12/83			
1) Parameters characterizing the suitability of the ground-water as a drinking water supply? 265.92(b)(1)	✓		
2) Parameters establishing ground-water quality? 265.92(b)(2)	✓		
3) Parameters used as indicators of ground-water contamination? 265.92(b)(3)	✓		
(i) For each indicator parameter are at least four replicate measurements obtained at each upgradient well for each sample obtained during the first year of monitoring? 265.92(c)(2)	✓		
(ii) Are provisions made to calculate the initial background arithmetic mean and variance of the respective parameter concentrations or values obtained from the upgradient well(s) during the first year? 265.92(c)(2)	✓		
b) For facilities which have completed first year ground-water sampling and analysis requirements:			
1) Have samples been obtained and analyzed for the ground-water quality parameters at least annually? 265.92(d)(1)	✓		
2) Have samples been obtained and analyzed for the indicators of ground-water contamination at least semi-annually? 265.92(d)(2)	✓		

	Yes	No	Unknown
c) Were ground-water surface elevations determined at each monitoring well each time a sample was taken? 265.92(e)	✓		
d) Were the ground-water surface elevations evaluated annually to determine whether the monitoring wells are properly placed? 265.93(f)	✓		
e) If it was determined that modification of the number, location or depth of monitoring wells was necessary, was the system brought into compliance with 265.91(a)? 265.93(f)	N.A.		
10. Has an outline of a ground-water quality assessment program been prepared? 265.93(a)*	✓		
a) Does it describe a program capable of determining:			
1) Whether hazardous waste or hazardous waste constituents have entered the ground water?	✓		
2) The rate and extent of migration of hazardous waste or hazardous waste constituents in ground water?	✓		
3) Concentrations of hazardous waste or hazardous waste constituents in ground water?	✓		
b) After the first year of monitoring, have at least four replicate measurements of each indicator parameter been obtained for samples taken for each well? 265.93(b)	✓		
1) Were the results compared with the initial background means from the upgradient well(s) determined during the first year?	✓		
(i) Was each well considered individually?	✓		
(ii) Was the Student's t-test used (at the 0.01 level of significance)?	✓		
2) Was a significant increase (or pH decrease as well) found in the:			
(i) Upgradient wells	✓		
(ii) Downgradient wells	✓		
If "Yes", Compliance Checklist A-2 must also be completed.			

12/83
3/84
6/84
9/84

*See note Page 2-10

	Yes	No	Unknown
11. Have records been kept of analyses for parameters in 265.92(c) and (d)? 265.94(a)(1)	✓		
12. Have records been kept of ground-water surface elevations taken at the time of sampling for each well? 265.94(a)(1)	✓		
13. Have records been kept of required elevations in 265.93(b)? 265.94(a)(1)	✓		
14. Have the following been submitted to the Regional Administrator 265.94(a)(2) :*			
a) Initial background concentrations of parameters listed in 265.92(b) within 15 days after completing each quarterly analysis required during the first year?	✓		
b) For each well, have any parameters whose concentrations or values have exceeded the maximum contaminant levels allowed in drinking water supplies been separately identified?	✓		
c) Annual reports including:			
1) Concentrations or values of parameters used as indicators of ground-water contamination for each well along with required evaluations under 265.93(b)?	✓	latest one dated Jan 29, 1982 to MONR	
2) Any significant differences from initial background values in up-gradient wells separately identified?	✓		
3) Results of the evaluation of ground-water surface elevations?	✓		

also send quarterly updates from assoc. monitoring

*EPA will be proposing (Spring 1982) to replace this reporting requirement with an exception reporting system where reports will be submitted only where maximum contaminant levels or significant changes in the contamination indicators or other parameters are observed. EPA has delayed compliance stage for 14 a) above until August 1, 1982 (Federal Register, February 23, 1982, p.7841-7842) to be coupled with exception reporting in the interim.

APPENDIX A-2

INSPECTION COMPLIANCE FORM FOR A FACILITY WHICH MAY BE AFFECTING GROUND-WATER QUALITY

Company Name: Quanex ; EPA I.D. Number: _____

Company Address: _____ ; Inspector's Name: D Slayton

_____

_____

Company Contact/Official: _____ ; Branch/Organization: _____

Title: _____ ; Date of Inspection: 2/23/88

	Yes	No	Unknown	
Type of facility: (Check appropriately)				
a) surface impoundment	✓			
b) landfill		✓		
c) land treatment facility		✓		
d) disposal waste pile		✓		
1. Have comparisons of ground-water contamination indicator parameters for the upgradient well(s) 265.93(b) shown a significant increase (or pH decrease as well) over initial background?	✓			
a) If "Yes", has this information been submitted to the Regional Administrator according to 265.94(a)(2)(ii)?	✓			Initial report by Kock 6/15/87
2. Have comparisons of indicator parameters for the downgradient wells 265.93(b) shown a significant increase (or pH decrease as well) over initial background?	✓			
a) If "Yes", were additional ground-water samples taken for those downgradient wells where the significant difference was determined? 265.93(c)(2)	✓			
1) Were samples split in two?	✓			
2) Was the significant difference due to human (e.g., laboratory) error? (If "Yes", do not continue.)		✓		

	Yes	No	Unknown
3. If significant differences were not due to error, was a written notice sent to the Regional Administrator within 7 days of confirmation?	✓		5/8/85 to EPA
4. Within 15 days of notification of the Regional Administrator was a certified ground-water quality assessment plan submitted? 265.93(d)(2)*		✓	6/5/85
a) Does the plan specify 265.93(d)(3) :			— updated April 1986 in response to N.O.D.
1) well information (specifics)	✓		
(a) number?	✓		see 1986 Annual Report for summary of events. (dated 5/21/87)
(b) locations?	✓		
(c) depths?	✓		
2) sampling methods?	✓		
3) analytical methods?	✓		
4) evaluation methods?	✓		
5) schedule of implementation?	✓		
b) Does the plan allow for determination of 265.93(d)(4) :			
1) Rate and extent of migration of hazardous waste or hazardous waste constituents?	✓		Final plan approved Oct 1986. - sampling was oct 14-16, 1986
2) Concentrations of the hazardous waste or hazardous waste constituents?	✓		
c) Is it indicated that the first determination was made as soon as technically feasible? 265.93(d)(5)	✓		
1) Within 15 days after the first determination was a written report containing the assessment of ground-water quality submitted to the Regional Administrator?	✓		First report on assmt sent to Joe Baker in letter dated 12-4-86
d) Was it determined that hazardous waste or hazardous waste constituents from the facility have entered the ground water?	✓		
1) If "No", was the original indicator evaluation program, required by 265.92 and 265.93(b), reinstated?	N.A.		— Sampling continued to verify possible contamination
(a) Was the Regional Administrator notified of the reinstatement of program within 15 days of the determination? 265.93(d)(6)	N.A		

*See note Page 2-10

	Yes	No	Unknown
e) If it was determined that hazardous waste or hazardous waste constituents have entered the ground water 265.93(d)(7) :			
1) For facilities where program was implemented prior to final closure, are determinations of hazardous waste or hazardous waste constituents continued on a quarterly basis? (If program was implemented during the post-closure care period, determinations made in accordance with the ground-water quality assessment plan may cease after the first determination.)	✓		
(a) Were subsequent ground-water quality reports submitted to the Regional Administrator within 15 days of determination?	✓		To EPA, and now to DNR quarterly
2) Were records kept of the analyses and evaluations, specified in the ground-water quality assessment (throughout the active life of the facility)? 265.94(b)(1)	✓		
(a) If a disposal facility, were(are) records kept throughout the post-closure period as well?	N.A.		
f) Are annual reports submitted to the Regional Administrator containing the results of the ground-water quality assessment program? 265.94(b)(2)*	✓		Not one for 1987 dated 1-29-88 to DNR
1) Do the reports include the calculated or measured rate of migration of hazardous waste or hazardous waste constituents during the reporting period?	✓		

*See note Page 4-3

APPENDIX A-3

INSPECTION COMPLIANCE FORM FOR DEMONSTRATING A WAIVER OF INTERIM STATUS REQUIREMENTS

Company Name:_____; EPA I.D. Number:_____

Company Address:_____; Inspector's Name:_____

_____

_____

Company Contact:_____; Branch/Organization:_____

Title:_____; Date of Inspection:_____

	Yes	No	Unknown
1. Is a written waiver demonstration kept at the site?	____	____	
2. Is the demonstration certified by a qualified geologist or geotechnical engineer? 265.90(c)	____	____	
3. Does the waiver demonstration establish:			
a) The potential for migration of hazardous waste or hazardous waste constituents from the facility to the uppermost aquifer? 265.90(c)(1)	____	____	
b) An evaluation of a water balance including:			
1) Precipitation?	____	____	
2) Evapotranspiration?	____	____	
3) Runoff?	____	____	
4) Infiltration? (including any liquid in surface impoundments)	____	____	
c) Unsaturated zone characteristics?	____	____	
1) Geologic materials?	____	____	
2) Physical properties?	____	____	
3) Depth to ground water?	____	____	

APPENDIX -B

GROUND-WATER MONITORING AND ALTERNATE SYSTEM
TECHNICAL INFORMATION FORM

APPENDIX B

GROUND-WATER MONITORING AND ALTERNATE SYSTEM
TECHNICAL INFORMATION FORM

1.0 Background Data:

Company Name: Quanex ; EPA I.D.#: MID 082 767 591

Company Address: 400 McMunn
South Lyon, MI
48178

Inspector's Name: David Slayton ; Date: 2/23/88

1.1 Type of facility (check appropriately):

Refer to April 86 Amt Plan and Jan 1986 Part B

1.1.1	surface impoundment	✓
1.1.2	landfill	
1.1.3	land treatment facility	
1.1.4	disposal waste pile	

1.2 Has a ground-water monitoring system been established? (Y/N) Y

1.2.1 Is a ground-water quality assessment program outlined or proposed? (Y/N) Y

If Yes,

1.2.2 Was it reviewed prior to the site visit? (Y/N) Y

1.3 Has a ground-water quality assessment program been implemented or proposed at the site? (Y/N) Yes

If yes, Appendix C, Ground-Water Quality Assessment Program Technical Information Form must be utilized also.

2.0 Regional/Facility Map(s)

2.1 Is a regional map of the area, with the facility delineated, included? (Y/N) Yes

If yes,

2.1.1 What is the origin and scale of the map? Various - topo maps and site specific maps

2.1.2 Is the surficial geology adequately illustrated? (Y/N) No

2.1.3 Are there any significant topographic or surficial features evident? (Y/N) No

If yes, describe _____

2.1.4 Are there any streams, rivers, lakes, or wet lands near the facility? (Y/N) Yes

If yes, indicate approximate distances from the facility Yerkes Drain immediately south of plant 500-600', swamp 50' to west of S.I.

2.1.5 Are there any discharging or recharging wells near the facility? (Y/N) Yes

Refer to Report Plan April 1986

If yes, indicate approximate distances from the facility. Municipal well upgradient about ½ mile (+ east) from S.I. closest direction ½ mile + west

2.2 Is a regional hydrogeologic map of the area included? (This information may be shown on 2.1) (Y/N) No

If yes:

2.2.1 Are major areas of recharge/dishcarge shown? (Y/N) ___

If yes, describe. _____

2.2.2 Is the regional ground-water flow direction indicated? (Y/N) ___

2.2.3 Are the potentiometric contours logical? (Y/N) ___
If not, explain. _____

2.3 Is a facility plot plan included? (Y/N) Yes

2.3.1 Are facility components (landfill areas, impoundments, etc.) shown? (Y/N) Yes

2.3.2 Are any seeps, springs, streams, ponds, or wetlands indicated? (Y/N) Yes

2.3.3 Are the locations of any monitoring wells, soil borings, or test pits shown? (Y/N) Y

2.3.4 Is the facility a multi-component facility? (Y/N) No

If yes:

2.3.4.1 Are individual components adequately monitored? (Y/N) Yes

2.3.4.2 Is a Waste Management Area delineated? (Y/N) Yes

2.4 Is a site water table (potentiometric) contour map included? (Y/N) Yes

If yes,

April 1988 report plan

2.4.1 Do the potentiometric contours appear logical based on topography and presented data? (Consult water level data) (Y/N) Yes

2.4.2 Are groundwater flowlines indicated? (Y/N) Yes

2.4.3 Are static water levels shown? (Y/N) Yes

2.2.4 May hydraulic gradients be estimated? (Y/N) Yes

2.4.5 Is at least one monitoring well located hydraulically upgradient of the waste management area(s)? (Y/N) Yes

2.4.6 Are at least three monitoring wells located hydraulically downgradient of the waste management area(s)? (Y/N) Yes

2.4.7 By their location, do the upgradient wells appear capable of providing representative ambient groundwater quality data? (Y/N) Yes - new well 1

If no, explain. - may install upgradient wells deeper in aquifer to assess whether arsenic is naturally occuring deeper in the aquifer

*

3.0 Soil Boring/Test Pit Details

3.1 Were soil borings/test pits made under the supervision of a qualified professional? (Y/N) Yes

If yes,

3.1.1 Indicate the individual(s) and affiliation(s): well 1-9 ?
well 11 16 by EOI
(no well ID) -

3.1.2 Indicate the drilling/excavating contractor, if known EOI

3.2 If soil borings/test pits were made, indicate the method(s) of drilling/excavating:

- Auger (hollow or solid stem) ✓ hollow
- Mud rotary
- Air rotary
- Reverse rotary
- Cable tool
- Jetting
- Other, including excavation (explain)

3.3 List the number of soil borings/test pits made at the site

3.3.1 Pre-existing

3.3.2 For RCRA compliance 29 (includes those that had wells installed. Detection + Assessment)

3.4 Indicate borehole diameters and depths (if different diameters and depths use TABLE B-1).

3.4.1 Diameter: See table

3.4.2 Depth:

3.5 Were lithologic samples collected during drilling? (Y/N) Yes

If yes,

3.5.1 How were samples obtained? (Check method(s))

- Split spoon ✓
- Shelby tube, or similar
- Rock coring
- Ditch sampling
- Other (explain)

INFORMATION TABLE B-1

	BORING NO.	DEPTH	DIAMETER
Aug. 1983	SB-1	50'	4"
	SB-2	35'	"
	SB-3	25'	"
	SB-4	30'	"
	SB-5	30'	"
Oct. 1985	SB-18	20	unknown
	SB-19	20'	
	SB-20	20'	
	SB-21	20'	
	SB-22	20'	
	SB-23	30'	
	SB-24	30'	
	SB-25	30'	
	SB-26	25'	
no well logs	MW 1, 2, 3 4, 5, 8, 9		
Monitor well clusters - deepest boring	6	39'	
	7	75'	
	11	75'	
	12	75'	
	13	73'	
	14	30'	
	15	35'	
	16	30'	

3.5.2 At what interval were samples collected? 5'

3.5.3 Were the deposits or rock units penetrated described? (boring logs, etc.) (Y/N) Yes

3.6 If test pits were excavated at the site, describe procedures. None

4.0 Well Completion Detail

4.1 Were the wells installed under the supervision of a qualified professional? (Y/N) Yes

If yes: wells 11-16

4.1.1 Indicate the individual and affiliation, if known EOI
Engineering + Science, Grand Rapids

4.1.2 Indicate the well construction contractor, if known EOI

4.2 List the number of wells at the site

4.2.1 Pre-existing ____

4.2.2 For RCRA Compliance 27 - not all used for monitoring

4.3 Well construction information (fill out INFORMATION TABLE B-2)

4.3.1 If PVC well screen or casing is used, are joints (couplings):

- Glued on
- Screwed on ✓

See page 37 of work plan

4.3.2 Are well screens sand/gravel packed? (Y/N) ____

Monitor well numbers

1, 2, 3, 4, 5, 6A, 6B,
7A, 7B, 8, 9, 11A, 11B,
11C, 11D, 12A, 12B, 12C, 13A, 13B, 13C,
14A, 14B, 15A, 15B, 16A, 16B

See page 39 of Assmt Plan (April 1986) and 1987 Annual Report

INFORMATION TABLE B-2

info. From → page 44 of Jan 86 Part B

ORIGINAL RCRA WELLS MW1-4

	WELL NO.	MW1	MW2	MW3	MW4	MW5	
	GROUND ELEVATION ≈	918.6	918.4	912.2	904	905	
	TOTAL DEPTH ≈	17.6	19.0	13'	9'	9.5'	
WELL CASING	TYPE MATERIAL	galvanized steel →				→	
	DIAMETER	2"	2"	2"	2"	2"	
	LENGTH ≈	17'	19'	13'	10'	11'	
	STICK-UP ≈	2.4'	3'	3'	4.2'	3.6'	
	TOP ELEVATION	921.01	921.42	915.28	908.21	909.41	
	BOTTOM ELEVATION	904.0	902.6	901.9	898.2	898.5	
WELL SCREEN	DEPTH TOP/BOTTOM						
	TYPE MATERIAL	stainless steel →				→	
	DIAMETER	2"	2"	2"	2"	2"	
	LENGTH	3'	3'	3'	3'	3'	
	SLOT SIZE	unknown →				→	
	TOP ELEVATION	904.0	902.6	901.9	898.2	898.5	
	BOTTOM ELEVATION	901.0	899.6	898.9	895.2	895.5	
OPEN HOLE OR SAND/GRAVEL PACK	DEPTH TOP/BOTTOM						
	DIAMETER						
	LENGTH						
	TOP ELEVATION						
	BOTTOM ELEVATION						

4.3.3 Are annular spaces sealed? (Y/N) Yes

If yes, describe:

- bentonite slurry ✓
- Cement grout
- Other (explain) _____

- Thicknesses of seals from above screens to surface (bentonite slurry)

4.3.4 If "open hole" wells, are the cased portions sealed in place? (Y/N) NO

If yes, describe how: _____

4.3.5 Are there cement surface seals? (Y/N) Yes

If yes,

- How thick? 1'

4.3.6 Are the wells capped? (Y/N) Y

If yes,

- Do they lock? (Y/N) Y

4.3.7 Are protective standpipes cemented in place? (Y/N) Y (except 1-5)

4.3.8 Were wells developed? (Y/N) Yes

If yes, check appropriate method(s):

- Air lift pumping
- Pumping and surging ✓ unknown
- Jetting
- Bailing
- Other (explain) _____

5.0 Aquifer Characterization

5.1 Has the extent of the uppermost saturated zone (aquifer) in the facility area been defined? (Y/N) Yes

If yes,

5.1.1 Are soil boring/test pit logs included? (Y/N) Yes

5.1.2 Are geologic cross-sections included? (Y/N) Yes

5.2 Is there evidence of confining (low permeability) layers beneath the site? (Y/N) Yes (northern portion only)

If yes,

5.2.1 Is the areal extent and continuity indicated? (Y/N) Yes

5.2.2 Is there any potential for saturated conditions (perched water) to occur above the uppermost aquifer? (Y/N) NO

If yes, give details: _____

a) Should or is this perched zone being monitored? (Y/N) N.A.

Explain _____

5.2.3 What is the lithology and texture of the uppermost saturated zone (aquifer)? glacial outwash (fine sand to gravel)

5.2.4 What is the saturated thickness, if indicated? 15-30' in north; 70+ feet in south

5.3 Were static water levels measured? (Y/N) Yes

If yes,

5.3.1 How were the water levels measured (check method(s)).

- Electric water sounder
- Wetted tape ✓
- Air line
- Other (explain) _____

5.3.2 Do fluctuations in static water levels occur? (Y/N) yes

If yes,

5.3.2.1 Are they accounted for (e.g. seasonal, tidal, etc.)? (Y/N) Yes

If yes, describe: seasonal

5.3.2.2 Do the water level fluctuations alter the general ground-water gradients and flow directions? (Y/N) NO

If yes,

5.3.2.3 Will the effectiveness of the wells to detect contaminants be reduced? (Y/N) ____

Explain _____

_____

_____

5.3.2.4 Based on water level data, do any head differentials occur that may indicate a vertical flow component in the saturated zone? (Y/N) Yes

If yes, explain - downward near impoundments due to mounding, away from SI (lateral and vertical) head is upward

5.4 Have aquifer hydraulic properties been determined? (Y/N) Yes

If yes,

5.4.1 Indicate method(s):

- Pumping tests ____
- Falling/constant head tests ____
- Laboratory tests (explain) ____

In situ slug tests on 4 wells - see 5/21/87 quarterly report.

Cooper-Rice Method

5.4.2 If determined, what are the values for:

- Transmissivity ____
- Storage coefficient ____
- Leakage ____
- Permeability ✓
- Porosity ____
- Specific capacity ____

5.4.3 In cases where several tests were undertaken, were discrepancies in the results evident? (Y/N) No

If yes, explain _____

_____

5.4.4 Were horizontal ground-water flow velocities determined? (Y/N) Yes

If yes, indicate rate of movement 1985 annual report 0.22 Ft/day max

May 21, 1987 report (0.14 Ft/day max)

6.0 Well Performance

6.1 Are the monitoring wells screened in the uppermost aquifer? (Y/N) Yes

6.1.1 Is the full saturated thickness screened? (Y/N) No

6.1.2 For single completions, are the intake areas in the: (check appropriate levels)

- Upper portion of the aquifer ✓
- Middle of the aquifer ✓
- Lower portion of the aquifer ✓ (?)

some wells have 4 clusters

6.1.3 For well clusters, are the intake areas open to different portions of the aquifer? (Y/N) Yes

6.1.4 Do the intake levels of the monitoring wells appear to be justified due to possible contaminant density and groundwater flow velocity? (Y/N) Yes

7.0 Ground-Water Quality Sampling

7.1 Is a sampling (groundwater quality) program and schedule included? (Y/N) Yes

7.2 Are sample collection field procedures clearly outlined? (Y/N) Yes

7.2.1 How are samples obtained: (check method(s))

- Air lift pump ____
- Submersible pump ____
- Positive displacement pump ____
- Centrifugal pump ____
- Peristaltic or other suction-lift pump ____
- Bailer ✓ (stainless steel + teflon)
- Other (describe) ____

7.2.2 Are all wells sampled with the same equipment and procedures? (Y/N) Yes

If no, explain ____

7.2.3 Are adequate provisions included to clean equipment after sampling to prevent cross-contamination between wells? (Y/N) Yes

7.2.4 Are organic constituents to be sampled? (Y/N) Yes

If yes,

7.2.4.1 Are samples collected with equipment to minimize absorption and volatilization? (Y/N) Yes

If yes,

Describe equipment bailer, lowered slowly into well.

8.0 Sample Preservation and Handling

8.1 Have appropriate sample preservation and preparation procedures been followed (filtration and preservation where appropriate)? (Y/N) Y

8.2 Are samples refrigerated? (Y/N) Y

8.3 Are EPA recommended sample holding period requirements adhered to? (Y/N) Y

8.4 Are suitable container types used? (Y/N) Y

8.5 Are provisions made to store and ship samples under cold conditions (ice packs, etc.)? (Y/N) Y

8.6 Is a chain of custody control procedure clearly defined? (Y/N) Y

8.7 Is a specific chain of custody form illustrated? (Y/N) Y

If yes,

8.7.1 Will this form provide an accurate record of sample possession from the moment the sample is taken until the time it is analyzed? (Y/N) Y

9.0 Sample Analysis and Record Keeping

9.1 Is sample analysis performed by a qualified laboratory? (Y/N) Y

Indicate lab EDI lab, Grand Rapids

9.2 Are analytical methods described in the records? (Y/N) Y

9.2.1 Are analytical methods acceptable to EPA? (Y/N) Y

9.3 Are the required drinking water suitability parametters tested for? (Y/N) Y

9.4 Are the required groundwater quality parameters tested for? (Y/N) Y

9.5 Are the required groundwater contamination indicator parameters tested for? (Y/N) Y

9.6 Are any analytical parameters determined in the field? (Y/N) Y

Identify:

- pH ✓
- Temperature
- Specific conductance ✓
- Other (describe) _____

_____

9.7 Is a plan included to record information about each sample collected during the groundwater monitoring program? (Y/N) Yes

9.7.1 Are field activity logs included? (Y/N) Yes

9.7.2 Are laboratory results included? (Y/N) Yes

9.7.3 Are field procedures recorded? (Y/N) Yes

9.7.4 Are field parameter determinations included? (Y/N) Yes

9.7.5 Are the names and affiliation of the field personnel included? (Y/N) Yes

9.8 Are statistical analyses planned or shown for all water quality results where necessary? (Y/N) Yes - under Sampl. Program

9.8.1 Is an analysis program set-up which adheres to EPA guidelines? (Y/N) Y

9.8.2 Is Student's t-test utilized? (Y/N) Y
If other evaluation procedure used, identify _____ with continuity correction

_____

9.8.3 Are provisions made for submitting analysis reports to the Regional Administrator? (Y/N) Yes - done quarterly

10.0 Site Verification

10.1 Plot Plan indicating the locations of various facility components, ground-water monitoring wells, and surface waters? (Y/N) Yes

10.1.1 Is the plot plan used for the inspection the same as in the monitoring program plan documentation? (Y/N) Yes

If not, explain _____

_____

10.1.2 Are all of the components of the facility identified during the inspection addressed in the monitoring program documentation? (Y/N) Yes

If not, explain _____

_____

10.1.3 Are there any streams, lakes or wetlands on or adjacent to the site? (Y/N) Yes

If yes, indicate distances from waste management areas _____

swamp to west, Yerkes Prair south of plant

10.1.4 Are there any signs of water quality degradation evident in the surface water bodies? (Y/N) No

If yes, explain _____

_____

_____

10.1.5 Is there any indication of distressed or dead vegetation on or adjacent to the site? (Y/N) No

If yes, explain _____

_____

_____

10.1.6 Are there any significant topographic or surficial features on or near the site (e.g., recharge or discharge areas)? (Y/N) No

If yes, explain _____

_____

10.1.7 Are the monitor well locations and numbers in agreement with the monitoring program documentation? (Y/N) Yes

If no, explain _____

_____

10.1.7.1 Were locations and elevations of the monitor wells surveyed into some known datum? (Y/N) Yes

If not, explain _____ U.S.G.S.

_____

was resurveyed in check 1987

10.1.7.2 Were the wells sounded to determine total depth below the surface? (Y/N) Yes

If not, explain _____

_____

10.1.7.3 Were discrepancies in total depth greater than two feet apparent in any well? (Y/N) NO

If yes, explain _____

_____

10.1.8 Was ground water encountered in all monitoring wells? (Y/N) Yes

If not, indicate which well(s) were dry _____

_____

10.1.9 Were water level elevations measured during the site visit? (Y/N) Yes

If yes, indicate well number and water level elevation _____

_____

If not, explain _____

_____

(Both on 2/10/88)

Well #	steel tape consultant EDI	±	electric meter DNR measure	Depth (DNR) measured	well log or measured (Ant B) Depth in ft.	
MW 1	11.82	±0.1	11.93	19.0'	≈17.6	(2.4' stickup) OK
MW 11A	14.63	±0.08	14.71	27.5'	24.5	(2.6 stickup) OK
MW 11B	15.07	±0.22	15.29	37'	33.8	(2.5 stickup) OK
MW 13A	9.84	±0.10	9.94	22'	18.8	(3' ") OK
MW 13B	13.95	±0.05	14.00	53'	49.6	(2.7) ") OK
MW 14A	7.84	±0.09	7.91	15'	12.3	(2.6 ") OK

STATICS

from top of casing

Depth

from ground surface

ONR readings consistantly higher than EDI

APPENDIX - C

GROUND-WATER QUALITY ASSESSMENT PROGRAM INFORMATION FORM

APPENDIX C

GROUND-WATER QUALITY ASSESSMENT PROGRAM
INFORMATION FORM

Company Name: Quaner ; EPA I.D.#: MIO 082 767 591

Company Address: 400 McMunn
South Lyons, MI
48178

Inspector's Name: David Slayton ; Date: 2/23/88

1.0 Background

1.1 List the constituents (contaminants) originating from the waste management area: (use separate sheet if necessary triggered on pH, spec. conductance, TOC, TOX - now concentrating on Arsenic + 1,1 Dichloroethane in Asmt plan

1.2 Have the concentrations of the hazardous waste or hazardous waste constituents shown significant increases in:

- upgradient monitoring wells (Y/N) ____
- downgradient monitoring wells (Y/N) ✓ (Arsenic 1,1 Dichloroethane)

1.2.1 List or indicate on a map, the wells which have shown significant increases: (use separate sheet if necessary) 11B, 11D, 12C, 13B, 14A

See 1987 Annual report

1.3 Were the significant increases in contaminant concentration determined through the use of the student's t-Test? (Y/N) Yes with continuity correction

If no,

1.3.1 Explain procedure used

1.4 Has the possibility of error (e.g., laboratory) been eliminated? (Y/N) Yes

1.4.1 Explain

2.0 Contaminant Characteristics

2.1 If available, list the chemical and physical properties of the contaminants which have been detected in the ground water: (density, solubility, etc.). Include on a separate sheet if list is extensive Arsenic, 1,1 dichloroethane

3.0 Implementation of the Assessment Program

3.1 Has the extent of the migration of hazardous waste or hazardous waste constituents been determined? (Y/N) No - study ongoing; some work IE done.

If yes,

3.1.1 Indicate how: (check appropriate method(s))

- additional ground-water monitoring wells ✓
- geophysical methods
- computer simulation
- other, explain

3.2 Were monitoring wells installed? (Y/N) Yes

If yes,

3.2.1 Record monitoring well/peizometer completion data on INFORMATION TABLE C-1.

3.2.2 Were well clusters (nests) used or were wells with multiple intake areas constructed? Give details yes - clusters at 11, 12, 13, 14, 15, 16

3.2.3 Show the numbers and locations of the additional wells/peizometers on a site map.

3.2.4 Are the locations of the wells/piezometers justified in view of the water table or potentiometric surface map? (Y/N) Yes
Give details

C-1

INFORMATION TABLE

ALL WELLS INSTALLED NOV. 1985
INFO FROM JAN 1986 PART B, p. 44

		WELL NO.	11A	11B	11C	11D	12A	12B
		GROUND ELEVATION	918.7	918.8	918.7	918.6	916.3	916.2
		TOTAL DEPTH ≈	24.5	34'	59.5'	70.3'	14'	41.5
WELL CASING		TYPE MATERIAL	PVC	PVC	galv. steel	PVC	PVC	PVC
		DIAMETER	2"	2"	2"	2"	2"	2"
		LENGTH ≈	22.1	31.3	59'	69.8'	11.1	38.7
		STICK-UP ≈	2.6'	2.5'	2.6'	2.5'	2.1	2.2
		TOP ELEVATION	921.29	921.34	921.31	921.07	918.45	918.44
		BOTTOM ELEVATION	899.2	890.0	862.3	853.3	907.3	879.7
WELL SCREEN		DEPTH TOP/BOTTOM	19.5 / 24.5	28.8 / 33.8	56.4 / 59.4	65.3 / 70.3	9.0 / 14.0	36.5 / 41.5
		TYPE MATERIAL	PVC	PVC	stainless steel	PVC	PVC	PVC
		DIAMETER	2"	2"	2"	2"	2"	2"
		LENGTH	5'	5'	3'	5'	5'	5'
		SLOT SIZE	#10	#10	#7	#10	#10	#10
		TOP ELEVATION	899.2	890.0	862.3	853.3	907.3	879.7
		BOTTOM ELEVATION	894.2	885.0	859.3	848.3	902.3	874.7
OPEN HOLE OR SAND/GRAVEL PACK		DEPTH TOP/BOTTOM						
		DIAMETER						
		LENGTH						
		TOP ELEVATION						
		BOTTOM ELEVATION						

C-1

INFORMATION TABLE

	WELL NO.	12C	13A	13B	13C	14A	14B
	GROUND ELEVATION	916.3	917.8	917.9	918.0	911.6	911.7
	TOTAL DEPTH ≈	62'	19'	50'	72'	12'	29'
WELL CASING	TYPE MATERIAL	PVC	PVC	PVC	PVC	PVC	PVC
	DIAMETER	2"	2"	2"	2"	2"	2"
	LENGTH ≈	59.1	16.8	47.3	69.5'	9.9'	27.1
	STICK-UP ≈	2.3'	3'	2.7'	2.4'	2.6'	2.8'
	TOP ELEVATION	918.66	920.81	920.61	920.39	914.21	914.54
	BOTTOM ELEVATION	859.5	904.0	893.3	850.9	904.3	887.4
WELL SCREEN	DEPTH TOP/BOTTOM	56.8 / 61.8	13.8 / 18.8	44.6 / 49.6	69.1 / 92.1	7.3 / 12.3	24.3 / 29.3
	TYPE MATERIAL	PVC	PVC	PVC	PVC	PVC	PVC
	DIAMETER	2"	2"	2"	2"	2"	2"
	LENGTH	5'	5'	5'	5'	5'	5'
	SLOT SIZE	#10	#10	#10	#10	#10	#10
	TOP ELEVATION	859.5	904.0	893.3	850.9	904.3	887.4
	BOTTOM ELEVATION	854.5	899.0	868.3	845.9	899.3	882.4
OPEN HOLE OR SAND/GRAVEL PACK	DEPTH TOP/BOTTOM						
	DIAMETER						
	LENGTH						
	TOP ELEVATION						
	BOTTOM ELEVATION						

INFORMATION TABLE C-1

	WELL NO.	15A	15B	16A	16B		
	GROUND ELEVATION	910.9	910.8	913.0	912.8		
	TOTAL DEPTH ≈	9.3'	32'	12.1'	28.8'		
WELL CASING	TYPE MATERIAL	PVC	PVC	PVC	PVC		
	DIAMETER	2"	2"	2"	2"		
	LENGTH ≈	7.1	29.8	9.7	26.3		
	STICK-UP ≈	2.8	2.8	2.6	2.5		
	TOP ELEVATION	913.66	913.59	915.62	915.35		
	BOTTOM ELEVATION	906.6	883.8	905.9	889.0		—
WELL SCREEN	DEPTH TOP/BOTTOM	4.3 / 9.3	29.0 / 32.0	7.1 / 12.1	23.8 / 28.8	/	/
	TYPE MATERIAL	PVC	PVC	PVC	PVC		
	DIAMETER	2"	2"	2"	2"		
	LENGTH	5'	5'	5'	5'		
	SLOT SIZE	#10	#10	#10	#10		
	TOP ELEVATION	906.6	883.8	905.9	889.0		
	BOTTOM ELEVATION	901.6	878.8	900.9	884.0		
OPEN HOLE OR SAND/GRAVEL PACK	DEPTH TOP/BOTTOM	/	/	/	/	/	/
	DIAMETER						
	LENGTH						
	TOP ELEVATION						
	BOTTOM ELEVATION						

3.2.5 Are the depths of the monitoring wells/ piezometers justified due to the relative characteristics (e.g., densities) of the contaminants? (Y/N) Yes
Give details - have multiple levels

3.2.6 List any other methods (e.g., soil sample analysis) used to document the extent of the contamination. (use separate sheet if necessary) None

3.3 Has the rate of contaminant migration been determined? (Y/N) Yes

If yes, what is it and how was it determined? See 1987 annual report - calculations based on permeability (measured) and gradients.

3.3.1 Does the rate of migration differ for various contaminants? (Y/N) unknown
Give details

3.3.2 If known, what is the cause (reason) of (for) this differential in migration rates?

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

March 17, 1988

TO: Lynne King, Northville District Office, WMD

FROM: Liz Browne, HW Permits, WMD Liz

SUBJECT: Quanex Corp., Michigan Seamless Tube Division
South Lyons, MID 082 767 591

On February 10, 1988 I conducted a sampling inspection at this facility as part of a Comprehensive Monitoring Evaluation (CME). Although no violations of 40 CFR 265.92 [as referenced in Act 64 R299.11003(m)] were found at this time, concerns were noted and are mentioned within the following inspection summary.

EDI Engineering and Science of Grand Rapids conducts all field and laboratory work for the facility. The Ground Water Quality Assessment Program, dated April, 1986, authored by EDI, contained the Sampling and Analysis Plan (SAP) that was used for this review.

Static water level readings are taken with a steel tape to the nearest 0.01 foot. The readings are taken to the top of the casing, and not to the top of the locking cap. Although this is stated in the plan, it should be emphasized to field staff should personnel change. Measurements compared reasonably well with those obtained with the DNR meter.

Purging is accomplished using either stainless steel or teflon bottom filling bailers and polypropelene rope. A new bailer, steam cleaned prior to the site visit, with new rope attached at the time of purging is used. Three casing volumes are purged prior to sampling. The purge water is directed into a graduated bucket to enable a volume measurement, and to facilitate the disposal of the water away from the well. The methods used to determine purge volume needed, method of measuring purge volume removed, and the disposal of the purge water should all be addressed in the plan.

Samples are obtained using the same equipment as, and immediately after, purging, where recovery allows. The plan states that the wells should be sampled within 24 hours of purging. Sampling immediately after purging is the preferable method. If this is not possible, recovery rates should be determined for each well, and sampling done as soon as sufficient volume exists.

Field measured parameters include pH and specific conductance. The meters are calibrated at the beginning of the day. The plan only mentions pH as a field parameter, and does not address the meter calibration. The plan should be updated to reflect field conditions. Other

field work includes the filtering of the metals sample immediately upon collection, prior to preservation. These are all excellent field methods to attempt to maintain the integrity of unstable parameters.

Field QA/QC procedures include the use of clean bailers and new line as already mentioned. Additionally, trip and equipment blanks and sample replicates are used to evaluate the sampling program. These are all good measures to help to assure that representative samples are taken. One item of concern noted during the sampling was the handling of the bailer during volatile organic sampling. The bailer should be lowered carefully for all sample collection, to reduce aeration, but especially for the volatile organics. A note to emphasize this may be appropriate in the plan. Other items of potential concern were not noted during this inspection. The sampling crew appeared to be familiar with the plan, worked carefully, and kept adequate field notes.

Chain of custody appears to be well documented. Field notes, bottle labels, a chain of custody form and an Analytical Services Project Sheet are used to track all samples. Copies of all forms have been included in the plan. Good control can be maintained since sample requests, bottle orders, sampling and analysis are all handled by EDI.

A list of sample parameters with sample container, preservation, holding time, minimum sample size and method references is included in the plan. A table indicating the detection limit attainable by EDI's laboratory is needed to complete this set of information. Also, the method references for some parameters appear to be in error. The Standard Methods reference should be 421, not 412 for dissolved oxygen. Nitrate-nitrite should be method 353 for reference 3, not 201. Reference 3 method 415 should be cited for organic carbon, not 236. All references should be rechecked. The latest editions of the references (SW-846 3rd edition and Standard Methods 16th edition) should be used. Specific methods should be cited, rather than items 200-289 for metals analysis.

A quality assurance/quality control program for EDI's laboratory is needed. Items such as the use of spikes, duplicate samples and standards should be included. The plan does indicate that lab notebooks are kept, and discusses some of the items to be included. This additional information is needed to assure that the careful practices that were evidenced in the field are maintained through the sample preparation and analysis steps.

In summary, both the written plan and the field work were acceptable in most areas. The plan needs to be updated to include details on purging and lab QA/QC. It should also be changed to better reflect the field measurement information, measuring both pH and specific conductance at the time of sampling, as well as the method and schedule of meter calibration. More information on the methods used to filter the samples, and to decontaminate this equipment should be included. Clarification on the time elapsed between purging and sampling should be made, and a note on the care needed for volatile organic sampling should be added. Finally, Table 13 should include detection limits, and the method references need to be checked and updated to reflect newer editions of the references, where applicable.

This concludes the sampling and analysis portion of the CME inspection. A final summary document (including a hydrogeo evaluation, statistical review, ground water contours, etc.) will be forthcoming.

Please call if you have any questions regarding this review.

cc Mr. D. Slayton
Mr. J. Bohunsky
Mr. D. Drake
C&E File
CME Reports ✓
Ms. M. Sabadaszka, U.S. EPA-Region V

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Hazardous Waste Division

Monitor Well/Groundwater Sampling Form

Facility: Quanex   Location: S. Lyons

Type of Facility: mfg of seamless steel tubing

Contact: Don Comfort   Phone: (   )

WELL INFORMATION

Name/Number: MW1
Depth: 19
Diameter: 2"
Casing Height Above Ground:
Top of Casing Elevation: 921.01
Protective Barriers: Yes ___ No ✓

Cap Locked: Yes ✓ No ___
Casing Material: gch steel
Screen Slot Size: unknown
Screen Length: 3 ft.
Screen Material: stainless steel
Screen Packed: Yes ___ No ___

SAMPLING INFORMATION

Initial Static Water Level: 11.82 / 11.93
Method: EDI steel tape 11.82 / electric meter 11.93
Measured By: EDI / DNR
Purge Method: teflon bailer   Vol Purged: 3.5 gal   Recovery Rate: [illegible]
Stabilized pH: 6.5   Stabilized Conductance: 1580
Temperature: Appearance: clear

Staff Present: Brown / Slayton   Date: 2/10/88

Notes: measured to top of casing, not locking cap screwed on top.

Newly steam cleaned bailer w/ polypropylene rope attached to the well

Purge water poured into a graduated bucket for measurement

Large truck passed on road during (DNR) vial filling - smoke [illegible]

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Hazardous Waste Division

Monitor Well/Groundwater Sampling Form

Facility: Quanex Location: S. Lyon

Type of Facility: mfg of seamless steel tubing

Contact: Don Comfort Phone: ( )

WELL INFORMATION

Name/Number: 114
Depth: ≈ 27.5
Diameter: 2"
Casing Height Above Ground:
Top of Casing Elevation: 921.29
Protective Barriers: Yes ✓ No

Cap Locked: Yes ✓ No
Casing Material: PVC
Screen Slot Size: 0.01"
Screen Length: 5 Ft.
Screen Material: PVC
Screen Packed: Yes No ✓

SAMPLING INFORMATION

Initial Static Water Level: 14.63 / 14.71
Method: steel, chalked tape 14.63 / electric meter 14.71
Measured By: EDI / MDNR
Purge Method: SS bailer Vol Purged: 7 gals Recovery Rate: good
Stabilized pH: 6.8 Stabilized Conductance: 1720
Temperature: Appearance: very rusty → cloudy

Staff Present: Browne / Slayton Date: 2-10-88

Notes:

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Hazardous Waste Division

Monitor Well/Groundwater Sampling Form

Facility: Quanex Location: S. Lyons

Type of Facility: mfg of seamless steel tubing

Contact: Don Comfort Phone: ( )

WELL INFORMATION

Name/Number: 11B
Depth: 37
Diameter: 2"
Casing Height Above Ground:
Top of Casing Elevation: 921.34
Protective Barriers: Yes ✓ No

Cap Locked: Yes ✓ No
Casing Material: PVC
Screen Slot Size: 0.01"
Screen Length: 5 ft.
Screen Material: PVC
Screen Packed: Yes No ✓

SAMPLING INFORMATION

Initial Static Water Level: 15.07 / 15.29
Method: steel chalked tape 15.07 / electric meter 15.29
Measured By: EDI / MDNR
Purge Method: teflon bailer Vol Purged: 11 gal Recovery Rate: good
Stabilized pH: 6.8 Stabilized Conductance: 1680
Temperature: Appearance: very rusty →

Staff Present: Browne/Slayton Date: 2-10-88

Notes:

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Hazardous Waste Division

Monitor Well/Groundwater Sampling Form

Facility: Quanex Location: S. Lyons

Type of Facility: mfg. of seamless steel tubing

Contact: Don Comfort Phone: ( )

WELL INFORMATION

Name/Number: MW 13A
Depth: ≈ 33'
Diameter: 2"
Casing Height Above Ground:
Top of Casing Elevation: 930.81
Protective Barriers: Yes ✓ No
casing

Cap Locked: Yes ✓ No
Casing Material: PVC
Screen Slot Size: 0.01"
Screen Length: 5 ft.
Screen Material: PVC
Screen Packed: Yes No ✓

SAMPLING INFORMATION

Initial Static Water Level: 9.84 / 9.94
Method: steel chalked tape 9.84 / electric meter 9.94
Measured By: EDI / MDNR
Purge Method: SS bailer Vol Purged: 3 1/3 gal Recovery Rate: good
Stabilized pH: Stabilized Conductance:
Temperature: Appearance: silty

Staff Present: Browne / Slaytor Date: 2-10-88

Notes:

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Hazardous Waste Division

Monitor Well/Groundwater Sampling Form

Facility: Quanex Location: S. Lyons

Type of Facility: mfg of ~~seamless~~ seamless steel tubing

Contact: Don Comfort Phone: ( )

WELL INFORMATION

Name/Number: MW 13B
Depth: 53'
Diameter: 2"
Casing Height Above Ground: _____
Top of Casing Elevation: 930.61
Protective Barriers: Yes ✓ No ~~✓~~

Cap Locked: Yes ✓ No ___
Casing Material: PVC.
Screen Slot Size: 0.01"
Screen Length: 5 Ft.
Screen Material: PVC
Screen Packed: Yes ___ No ✓

SAMPLING INFORMATION

Initial Static Water Level: 13.95 / 14.00
Method: Steel, chalked top 13.95 / electric meter 14.00
Measured By: EDI / MDNR
Purge Method: Teflon bailer Vol Purged: 20 gal Recovery Rate: slow
Stabilized pH: _____ Stabilized Conductance: _____
Temperature: _____ Appearance: silt on bottom, water clear

Staff Present: Browne / Slayton Date: 2-10-88

Notes:

MW13C - 13.17

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Hazardous Waste Division

Monitor Well/Groundwater Sampling Form

Facility: Quanex Location: S. Lyons

Type of Facility: _____

Contact: Don Comfort Phone: ( )

WELL INFORMATION

Name/Number: MW 14A
Depth: 15'
Diameter: 2"
Casing Height Above Ground: _____
Top of Casing Elevation: 914.21
Protective Barriers: Yes ✓ No ___

Cap Locked: Yes ✓ No ___
Casing Material: PVC
Screen Slot Size: 0.01"
Screen Length: 5 Ft.
Screen Material: PVC.
Screen Packed: Yes ___ No ✓

SAMPLING INFORMATION

Initial Static Water Level: 7.84 / 7.91
Method: EDI / electric meter
Measured By: Steel chalked tape /
Purge Method: S.S. Bailer Vol Purged: 3.5 gal Recovery Rate: good
Stabilized pH: 6.6 Stabilized Conductance: 1660
Temperature: _____ Appearance: very silty

Staff Present: Brown / Slayton Date: 2-10-88

Notes:

EDI vehicle running during this well sampling - parked ~ 25' from well, weren't directly upwind

DNR sampling staff: Browne / Slayton

Facility sampling staff: EDI - Gary Bouwens / Don Johnson

(if purging and/or sampling methods differ, report facility method/DNR method)

Monitor Well#	MW1	MW3A	MW3B	MW14A	MW11A	MW11B
SWL (and method used)	11.82 / 11.93	9.84 / 9.94	13.95 / 14.00	7.84 / 7.91	14.63 / 14.71	15.07 / 15.29
Sounding ft	19	~~22~~	53'	15	27.5	37
Volume Purged gal	3.5	6 1/3	20	3.5	7	11
Purging Method	tef. bailer	ss bailer	teflon bailer	ss bailer	ss bailer	tef. bailer
Sampling Method	" "	" "	" "	ss bailer	ss bailer	tef. bailer
Lysimeter#						
Volume Purged						
Sampling Method						
Surface Water#						
Description						
Sampling Method						
Detection System#						
Sampling Method						
Private Well #						
Location Sampled						
Length of Time Purged						

Facility Sampling Notes:

Potential External Sources of Contamination: other than light truck traffic none noted

Precautions Taken: none noted

Field Measurements Taken: pH + spec cond - calibrated first

Handling/Preservation: as appropriate - field filter, then preserve

Sampling Bottles Used: as appropriate

Replicates and/or Blanks Taken: various replicates + a field blank

Decontamination Procedures: new bailer / well - changed rope

Additional Notes: running metals + volatiles only (pH + spc in field) - GW Assessment should lower bailer more carefully for volatiles

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Hazardous Waste Division

Geotechnical Subunit

Sampling Data Sheet

FACILITY: Quanex LOCATION: South Lyons

CONTACT: Don Comfort

	Sample#	MW1	MW13A	MW13B	MW14A	MW11A	MW11B	FB
	Date	2-10-88	2-10-88	2-10-88	2-10-88	2-10-88	2-10-88	2-10-88
	Time	1145	1230	1235	1255	1325	1335	1340
	pH (field)	6.5	6.6	6.8	6.6	6.8	6.8	—
	Conductivity (field)	1880	2200	1645	1660	1720	1680	—
(PO)	1	✓	✓	✓	✓	✓	✓	✓
(PO)	2	✓	✓	✓	✓	✓	✓	✓
OBN	3,4,6,7,9							
OA	8							
OG	oil & grease							
(MA/D)	basic 6/Fe	✓	✓	✓	✓	✓	✓	✓
	Ca/Mg/Na/K	✓	✓	✓	✓	✓	✓	✓
	~~Hg~~/(As)/~~Se~~/~~Sb~~ Mn/B	✓	✓	✓	✓	✓	✓	✓
(MN)	Cl/SO_4/Alk	✓	✓	✓	✓	✓	✓	✓
	HCO_3/CO_3	✓	✓	✓	✓	✓	✓	✓
	Fluoride/Cr^{+6}							
GA	COD/TOC							
	NO_3NO_2/NH_3							
	Kjel N/TotP							
	Phenols							
GB	Total/Free Cn							
					dk brown			
	Sample Appearance	clear	↑ silt	clear	very silty	cloudy	very cloudy	—

Additional Notes:

EL 070
4/87
MATRIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

Not Expected
SAFETY WARNING
YES / NO - INFO ON BACK

LAB ORDER# 8802-041 PROJ CODE _____ PRIORITY II RECEIVED AT LAB BY JV DATE TIME 2/11/88 9:45 (AM) PM

SUBMITTER DIVISION WMD DISTRICT OR OFFICE HW Permits CONTACT PERSON FOR QUESTIONS Liz Browne PHONE (517) - 373-2730

LOCATION SAMPLED Quanex, South Lyons COLLECTED BY Browne/Slayton TRANS TO _____

COST CENTER 90026 SEND RESULTS TO ATTENTION OF Liz Browne AT ADDRESS (if different than above office) WMD - HW Permits, S. Ottawa Tower, Lansing

SAMPLE REMARKS please enter field data on to SAM

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION pH	spec cond.
01	MW 1	880210	1145	6.5	1880
02	MW 11A	880210	1325	6.8	1720
03	MW 11B	880210	1335	6.8	1680
04	MW 13A	880210	1230	6.6	2200
05	MW 13B	880210	1235	6.8	1645

GENERAL CHEMISTRY

DO Diss Oxygen ... 1 2 3 4 5
GN o-Phos NO2- ... 1 2 3 4 5 (GN1)
Residue SS 1 2 3 4 5
Residue TDS ... 1 2 3 4 5
..... 1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
..... 1 2 3 4 5
GA COD 1 2 3 4 5
TOC 1 2 3 4 5
NO3+NO2, NH3 . 1 2 3 4 5 (GA2)
KJEL N, Tot P . 1 2 3 4 5
..... 1 2 3 4 5
GG Phenolics 1.2.3.4.5
GB Total CN 1.2.3.4.5
Free CN 1.2.3.4.5
BC Fecal Coli 1.2.3.4.5
Total Coli 1.2.3.4.5
CA Chlorophyll 1.2.3.4.5

ORGANICS

(PO1) #1 Halocarbons (1 2 3 4 5)
(PO2) #2 Aromatic HC (1 2 3 4 5)
..... 1 2 3 4 5
ON #3 Chlord HC + Pest & PCB .. 1 2 3 4 5
..... 1 2 3 4 5
OB GC/MS Base Neut 1 2 3 4 5
..... 1 2 3 4 5
OA #8 Phenols 1 2 3 4 5
..... 1 2 3 4 5
OG Oil & Grease .. 1 2 3 4 5

**** SPECIAL REQUESTS ****

..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5

INORGANIC

MA Total Metals 1 2 3 4 5
(MAD) Diss-Field Filtered .. (1 2 3 4 5)
MD Diss-Lab Filtered 1 2 3 4 5
Ca Mg Na K ..... (1 2 3 4 5) (MA1)
Cd Cr Cu Ni Pb Zn .... (1 2 3 4 5) (MA2)
(Fe) Co Li (Mn) ..... (1 2 3 4 5) (MA3)
Al (Ba) Be Mo Ti V ..... (1 2 3 4 5) (MA4)
..... 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
(As) - Arsenic ..... (1 2 3 4 5)
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
..... 1 2 3 4 5
LOW LEVEL Ag 1 2 3 4 5
" " Cd 1 2 3 4 5
" " Cr Cu Ni Pb .. 1 2 3 4 5 (MF1)
..... 1 2 3 4 5
(MN) pH, Conductance 1 2 3 4 5 (MN1)
Cl, SO4, Total Alk ... (1 2 3 4 5) (MN2)
HCO3- CO3= ..... (1 2 3 4 5) (MN3)
CR+6 ..... 1 2 3 4 5
Fluoride 1 2 3 4 5
..... 1 2 3 4 5

EL 070
4/87
MATRIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

Not Expected
***** SAFETY WARNING *****
YES / (NO) - INFO ON BACK

LAB ORDER# 8802-041 PROJ CODE _____ PRIORITY II RECEIVED AT LAB BY WL DATE TIME 2/11/88 9:45 (AM) PM

SUBMITTER DIVISION WMD DISTRICT OR OFFICE HW Permits CONTACT PERSON FOR QUESTIONS Liz Browne PHONE (517) - 373-2730

LOCATION SAMPLED Quanex, South Lyons COLLECTED BY Browne/Slayton TRANS TO _____

COST CENTER 90026 SEND RESULTS TO ATTENTION OF Liz Browne AT ADDRESS (if different than above office) WMD- HW Permits, S. Ottawa Tower, Lansing

SAMPLE REMARKS Please enter field data on to SAM

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION	
				pH	spec cond.
06	MW 14A	880210	1255	6.6	1660
07	FB Field Blank	880210	1340	—	—
03					
04					
05					

GENERAL CHEMISTRY

DO Diss Oxygen ... 1 2 3 4 5 | -J-
GN o-Phos NO2- ... 1 2 3 4 5 | GN1
Residue SS 1 2 3 4 5
Residue TDS ... 1 2 3 4 5
..... 1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
..... 1 2 3 4 5 | -K-
GA COD 1 2 3 4 5
TOC 1 2 3 4 5
NO3+NO2, NH3 .. 1 2 3 4 5 | GA2
KJEL N, Tot P . 1 2 3 4 5
..... 1 2 3 4 5 | -L-
GG Phenolics .....1.2.3.4.5 | -M-
GB Total CN 1.2.3.4.5
Free CN .....1.2.3.4.5 | -N-
BC Fecal Coli 1.2.3.4.5
Total Coli .....1.2.3.4.5 | -P-
CA Chlorophyll ....1.2.3.4.5 | -Q-

ORGANICS

(P01) #1 Halocarbons (1) 2 3 4 5 | -R-
(P02) #2 Aromatic HC (1) 2 3 4 5
..... 1 2 3 4 5 | -S-
ON #3 Chloro HC + Pest & PCB . 1 2 3 4 5
..... 1 2 3 4 5 | -T-
OB GC/MS Base Neut 1 2 3 4 5
..... 1 2 3 4 5 | -U-
OA #8 Phenols 1 2 3 4 5
..... 1 2 3 4 5 | -V-
OG Oil & Grease .. 1 2 3 4 5

**** SPECIAL REQUESTS ****

..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5

INORGANIC

MA Total Metals 1 2 3 4 5
(MAD) Diss-Field Filtered ... (1) 2 3 4 5
MD Diss-Lab Filtered ..... 1 2 3 4 5 | -X-

Ca Mg Na K ..... (1) 2 3 4 5 | MA1
Cd Cr Cu Ni Pb Zn .... (1) 2 3 4 5 | MA2
(Fe) Co Li (Mn) ..... (1) 2 3 4 5 | MA3
Al (Ba) Be Mo Ti V ..... (1) 2 3 4 5 | MA4
..... 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
(As) - Arsenic ..... (1) 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
..... 1 2 3 4 5
LOW LEVEL Ag 1 2 3 4 5
" " Cd 1 2 3 4 5
" " Cr Cu Ni Pb .. 1 2 3 4 5 | MF1
..... 1 2 3 4 5 | -Y-

MN pH, Conductance ..... (1) 2 3 4 5 | MN1
Cl, SO4, Total Alk ... (1) 2 3 4 5 | MN2
HCO3- CO3= ..... (1) 2 3 4 5 | MN3
CR+6 ..... 1 2 3 4 5
Fluoride 1 2 3 4 5
..... 1 2 3 4 5

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY

REPORT Waste Management Division
TO Ottawa Building
Lansing, MI 48909

ATTEN Lin Brewer

LABORATORY WORK ORDER # 88-12-041
WORK ID QUANEX - SOUTH LYON
P.O. # 90070 COST $ 1115.50
RECEIVED 12/14/88 CLIENT WM
REPORTED _____ NUMBER OF SAMPLES 7
LAB CONTACT SM JP MATRIX WATER

TEST / UNITS	MW 1	MW 11A	MW 11B	MW 13A
Alkalinity of Water mg CaCO3/l	103	136	120	308
Carbonate Alkalinity mg CaCO3/l	K 5	K 5	K 5	K 5
Bicarbonate Alkalinity mg CaCO3/l	103	136	120	308
Chloride in Water mg/l	47	74	78	44
Arsenic - Dissolved ug/l (Diss)	K 2.0	3.4	4.0	K 2.0
Barium - Dissolved ug/l (Diss)	34.0	72.0	22.0	125
Calcium - Dissolved mg/l (Diss)	365	374	334	497
Cadmium - Dissolved ug/l (Diss)	K 20	K 20	K 20	K 20
Chromium - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Copper - Dissolved ug/l (Diss)	K 20	K 20	K 20	K 20
Iron - Dissolved ug/l (Diss)	3300	5950	3100	3500
Potassium - Dissolved mg/l (Diss)	7.6	10.6	5.14	2.45
Magnesium - Dissolved mg/l (Diss)	32.2	34.2	37.5	78
Manganese - Dissolved ug/l (Diss)	995	885	450	900
Sodium - Dissolved mg/l (Diss)	84.1	61.3	61.9	61.1
Nickel - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Lead - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Zinc - Dissolved ug/l (Diss)	970	K 50	K 50	K 50
FIELD - Conductivity umho/cm	1880	1720	1680	2200

TEST	UNITS	MW 1	MW 11A	MW 11B	MW 13A
FIELD - pH of Water	pH	6.5	6.8	6.8	6.6
Sulfate in Water	mg/l	1070	910	818	1120

TEST	UNITS	MW 13B	MW 14A	FIELD BLANK
Alkalinity of Water	mg CaCO3/l	142	350	K 5.0
Carbonate Alkalinity	mg CaCO3/l	K 5	K 5	K 5
Bicarbonate Alkalinity	mg CaCO3/l	142	350	K 5
Chloride in Water	mg/l	50	170	K 1.0
Arsenic - Dissolved	ug/l (Diss)	4.0	6.6	K 2.0
Barium - Dissolved	ug/l (Diss)	26.0	118	K 10.0
Calcium - Dissolved	mg/l (Diss)	391	306	K 1
Cadmium - Dissolved	ug/l (Diss)	K 20	K 20	K 20
Chromium - Dissolved	ug/l (Diss)	K 50	K 50	K 50
Copper - Dissolved	ug/l (Diss)	K 20	K 20	K 20
Iron - Dissolved	ug/l (Diss)	6350	12500	K 100
Potassium - Dissolved	mg/l (Diss)	5.2	3.4	K .1
Magnesium - Dissolved	mg/l (Diss)	53	19.7	K 1
Manganese - Dissolved	ug/l (Diss)	360	170	K 20
Sodium - Dissolved	mg/l (Diss)	54.6	73	K 1
Nickel - Dissolved	ug/l (Diss)	K 50	K 50	K 50
Lead - Dissolved	ug/l (Diss)	K 50	K 50	K 50
Zinc - Dissolved	ug/l (Diss)	K 50	480	K 50
FIELD - Conductivity	umho/cm	1645	1660	
FIELD - pH of Water	pH	6.8	6.6	
Sulfate in Water	mg/l	1050	330	K 2.0

Report prepared by: D Hartig 4-14-88

SAMPLE ID MW 1 FRACTION 01A TEST CODE SC_1 NAME Scan 1 Water
Date & Time Collected 02/10/89 11:45:00 Category

ANALYST KAJIYA
ANALYZED 03/01/89
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID MW 1 FRACTION 01A TEST CODE SC 2 NAME Ocean Water
Date & Time Collected 02/10/98 11:45:00 Category

ANALYST KAJIYA
ANALYZED 03/01/98
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3	Xylene (meta)	ND		1.0

COMMENTS MF

ND = not detected at the specified detection limit.

SAMPLE ID MW 11A FRACTION 02A TEST CODE GC 1 NAME Scan 1 Water
Date & Time Collected 02/10/88 13:25:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromoethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloroethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID MW 11A FRACTION 02A TEST CODE GC 2 NAME Scan 2 Water
Date & Time Collected 02/10/88 13:25:00 Category

ANALYST KAJIYA.
ANALYZED 03/01/88
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3	Xylene isomers	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.

SAMPLE ID MW 11B FRACTION 03A TEST CODE SC 1 NAME Stan 1 Water
Date & Time Collected 02/10/88 13:35:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromoethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	4.0		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID MW 11B FRACTION 03A TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 02/10/88 13:35:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-7	Toluene	1.1	UC	1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3	Xylene Isomers	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.

SAMPLE ID MW 13A FRACTION 04A TEST CODE SC 1 MATRIX Scan 1 Water
Date & Time Collected 02/10/88 12:30:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-87-7	*Bromoethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		* 5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID MW 13A FRACTION 049 TEST CODE 8C_2 NAME Gran 2 Water
Date & Time Collected 02/10/88 13:30:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3	Xylene isomers	ND		1.0

COMMENTS MT

ND = not detected at the specified detection limit.

SAMPLE ID MW 13B FRACTION 05A TEST CODE EC 1 NAME Ocean 1 Water
Date & Time Collected 02/10/88 12:35:00 Category

ANALYST KAIYA
ANALYZED 03/01/88
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromoethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID MW 133 STATION 05A TEST CODE BC 2 NAME Basn 2 Water
Date & Time Collected 02/10/88 12:35:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
1330-20-7	Xylene isomers	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.

SAMPLE ID MW 14A FRACTION 06A TEST CODE SC 1 NAME Step 1 Water
Date & Time Collected 02/10/88 12:55:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID MW 14A FRACTION 06A TEST CODE SC 2 NAME Beam 2 Water
Date & Time Collected 02/10/88 12:33:00 Category

ANALYST KASIYA
ANALYZED 03/01/88
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3	Xyle s Isomers	ND		1.0

COMMENTS MT

ND = not detected at the specified detection limit.

SAMPLE ID FIELD BLANK FRACTION 07A TEST CODE GC 1 MATRIX Scan 1 Water
Date & Time Collected 02/10/88 13:40:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1 UNITS ug/L ppb

CASR	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromoethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS LAB WATER BLANK

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID FIELD BLANK FRACTION 07A TEST CODE 8C 2 NAME Scan 2 Water
Date & Time Collected 02/10/88 13:40:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3	Xylene isomers	ND		1.0

COMMENTS LAB WATER BLANK

ND = not detected at the specified detection limit.

Duane x Corp, South Lyons MID 082 767 591

Parameter	mg/l unless noted	MW1	MW11A	MW11B	MW13A	MW13B	MW14A	Field Blank
Alkalinity		103	136	120	308	142	350	<5.0
Carbonate Alk		<5	<5	<5	<5	<5	<5	<5
Bicarbonate Alk		103	136	120	308	142	350	<5
Chloride		47	74	78	44	50	170	<1.0
Arsenic		<0.002	0.0034	0.004	<0.002	0.004	0.00666	<0.002
Barium		0.034	0.072	0.022	0.125	0.026	0.118	<0.01
Calcium		365	374	334	497	391	306	<1
Cadmium		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chromium		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	dissolved	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron		3.3	5.95	3.1	3.5	6.35	12.5	<0.1
Potassium		7.6	10.6	5.14	2.45	5.2	3.4	<0.1
Magnesium		32.2	34.2	37.5	78	53	19.7	<1
Manganese		0.995	0.885	0.45	0.9	0.36	0.17	<0.02
Sodium		84.1	61.3	61.9	61.1	54.6	73	<1
Nickel		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc		0.97	<0.05	<0.05	<0.05	<0.05	0.48	<0.05
Conductivity (field)	µmhos/cm	1880	1720	1680	2200	1645	1660	—
pH (field)	su	6.5	6.8	6.8	6.6	6.8	6.6	—
Sulfate		1070	910	818	1120	1050	330	< 2.0
	µg/l							
1,1 Dichloroethane		<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0
Others in Scan 1 *		<detection	<detection	<detection	<detection	<detection	<detection	<detection
Toluene		<1.0	<1.0	1.1 UC	<1.0	<1.0	<1.0	<1.0
Others in Scan 2 *		<detection	<detection	<detection	<detection	<detection	<detection	<detection

* All volatile organic scan data coded HT
HT - The recommended maximum laboratory holding time was exceeded before analysis.
See attached list for organic scan parameters and detection limits.

SCAN 1 - PURGEABLE HALOCARBONS

COMPOUND	DETECTION LIMIT (ug/l)
Vinyl chloride	5.0
Bromomethane*	5.0
Chloroethane*	5.0
Trichlorofluoromethane*	5.0
1,1-Dichloroethene	1.0
Methylene chloride*	5.0
trans-1,2-Dichloroethene	1.0
1,1-Dichloroethane*	1.0
cis-1,2-Dichloroethene	1.0
Chloroform*	1.0
1,1,1-Trichloroethane*	1.0
Carbon tetrachloride*	1.0
1,2-Dichloroethane*	1.0
Trichloroethene	1.0
1,2-Dichloropropane*	1.0
Bromodichloromethane*	1.0
cis-1,3-Dichloropropene	1.0
trans-1,3-Dichloropropene	1.0
1,1,2-Trichloroethane*	1.0
Tetrachloroethene	1.0
Dibromochloromethane*	1.0
Chlorobenzene	5.0
Bromoform*	1.0
1,1,2,2-Tetrachloromethane*	1.0

* Compound not confirmed by second independent technique.

SCAN 2 - PURGEABLE AROMATIC HYDROCARBONS

COMPOUND	DETECTION LIMIT (ug/l)
Benzene	1.0
Toluene	1.0
Ethylbenzene	1.0
Xylene isomers	1.0